


THE FINANCIAL SERVICES ROUNDTABLE 
Impacting Policy. Impacting People.

The Financial Services Roundtable Blue Ribbon Commission on Mega-Catastrophes

A Call to Action



EDWARD B. RUST, JR.

CHAIRMAN BLUE RIBBON COMMISSION ON MEGA CATASTROPHES
CHAIRMAN AND CHIEF EXECUTIVE OFFICER, STATE FARM INSURANCE COMPANIES

KERRY KILLINGER

VICE-CHAIRMAN BLUE RIBBON COMMISSION ON MEGA CATASTROPHES
CHAIRMAN AND CHIEF EXECUTIVE OFFICER, WASHINGTON MUTUAL, INC.

TABLE OF CONTENTS

MESSAGE

ACKNOWLEDGEMENTS

CHAPTER 1	EXECUTIVE SUMMARY AND RECOMMENDATIONS.....	5
CHAPTER 2	THREATS POSED BY POSSIBLE FUTURE MEGA-CATASTROPHES.....	13
CHAPTER 3	THE ROLE OF THE FINANCIAL SECTOR IN MEGA-CATASTROPHES.....	27
CHAPTER 4	REDUCING THE COSTS AND IMPACTS FROM FUTURE MEGA-CATASTROPHES RECOMMENDATIONS 1- 6 AND 24.....	32
CHAPTER 5	PAYING FOR MEGA-CATASTROPHES RECOMMENDATIONS 7 – 14 AND 25.....	44
CHAPTER 6	IMPROVING RESPONSES TO AND RECOVERY FROM MEGA-CATASTROPHES. RECOMMENDATIONS 15 - 23.....	66
CHAPTER 7	CONCLUSION.....	75
Appendix A	Blue Ribbon Commission on Mega-Catastrophes.....	76
Appendix B	Methodology for Economic Loss Projections.....	79
Appendix C	Design Issues Under a Federal Natural Catastrophe Reinsurance Program.....	85
Bibliography	87

MESSAGE FROM COMMISSION CHAIRMAN EDWARD B. RUST, JR. AND VICE CHAIRMAN KERRY KILLINGER

Hurricanes. Earthquakes. Floods. Pandemic. Terrorist Attack.

A mega-catastrophe is a natural or man-made event that has *significant* adverse national impacts on economic activity, property or human life.

The Blue Ribbon Commission on Mega-Catastrophes was formed to develop a comprehensive report on the particular challenges the United States faces from mega-catastrophes, and to make recommendations to:

- Reduce the impact of mega-catastrophes on human life and the economy
- Pay for the costs of rebuilding and reconstruction after mega-catastrophes in an efficient and equitable manner
- Improve the immediate responses to and recovery from mega-catastrophes

Mega-catastrophes can result from natural and man-made causes. By their nature, they have widespread and tragic effects, and through modern means of communication, people from virtually every nation see the impacts of these events in real time. We all watched in horror as events unfolded in the wake of the tsunami that hit Indonesia, Sri Lanka and Thailand in December 2004, and when Hurricane Katrina struck the Gulf Coast of the United States in August 2005. Similarly, it was shocking to witness via television the horrific terrorist attacks on the United States on September 11, 2001.

Events such as these cannot merely be unfortunate incidents in our collective histories. We must learn lessons from them, and apply those lessons to minimize the consequences of future mega-catastrophes (if not the catastrophes themselves). Above all else, we certainly know one thing from past such events: preparation makes all the difference.

Although events never unfold exactly as we have planned, having no plan is simply a plan for failure.

This Commission has coordinated and consulted with a variety of scholars and experts in the fields of financial services, medicine, science, and economics. We owe deep gratitude for their efforts and insights.

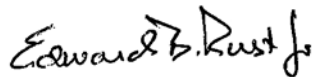
We produced two Interim Reports prior to this final report: *Accelerating the Katrina Recovery*, October 25, 2006 and *Preparing for Pandemic Flu: A Call to Action*, November 1, 2006. We have drawn on both reports in preparing this final report. This report covers a range of mega catastrophes:

- Hurricane
- Earthquake
- Flood
- Pandemic
- Terrorist Attack

It would be a major mistake for our country to be complacent about each of these future disasters. As we say in the first chapter of this report, it is painful to think about even one of them, let alone all of them. But our nation, and we as individuals, will handle these events much better, with less loss of life and damage to our economy and to the fabric of our society, if we take steps to plan now for their potentially tragic consequences.

We urge policymakers at all levels of government to take prompt action to implement the recommendations that follow. We also look forward to your questions and comments on this report.

With best wishes,



Edward B. Rust, Jr.

Chairman

Blue Ribbon Commission on Mega Catastrophes

Chairman and Chief Executive Officer

State Farm Insurance Companies



Kerry Killinger

Vice-Chairman

Blue Ribbon Commission on Mega Catastrophes

Chairman and Chief Executive Officer

Washington Mutual, Inc.

ACKNOWLEDGEMENTS

The Financial Services Roundtable is a unique trade association, limited to 100 of the largest financial services companies in the United States. Built on the legislative foundation created in the Gramm-Leach-Bliley Act of 1999, the Roundtable believes that a competitive market is the best system for financing the American economy. Regulation and regulatory structures should ensure safety and soundness and consumer protection, but not stifle the competitive market system.

The Roundtable is committed to uniform national standards, a strong economy, and the promotion of U.S.-based companies in the global economy.

In the wake of recent major disasters – the 2004 tsunami and Hurricanes Katrina and Rita – a consortium of Roundtable member company CEOs undertook an enormous task: identify the significant threats to business continuity and human health and safety posed by a wide range of disasters (natural or manmade); identify measures to minimize the human and economic losses from those losses; recommend ways to pay for the losses in a more efficient and expeditious manner than currently exists; and improve the response to and recovery from such future disasters. This report embodies the response to this challenge.

We owe deep gratitude to the Chairman of the Commission, Edward B. Rust, Jr. of the State Farm Insurance Companies, and the Vice Chairman, Kerry Killinger of Washington Mutual, Inc. (WaMu).

The Roundtable is grateful to many individuals who provided their time, energy and expertise to this project. It could not have been completed without their leadership and input.

In particular, we owe deep gratitude to the Chairman of the Commission, Edward B. Rust, Jr. of the State Farm Insurance Companies, and the Vice Chairman, Kerry Killinger of Washington Mutual, Inc. (WaMu). They provided the leadership and expertise that made this project and report possible.

The report also could not have been produced without the time, effort and expertise provided by the 41 extraordinary members of the Commission (listed on Appendix C of this Report), who researched, considered, and discussed these issues over nearly a year. We are grateful to the companies and trade organizations with whom these members are associated for supporting this effort, by making the members available for numerous meetings, and for providing the internal resources and knowledge that contributed to in depth analysis and recommendations contained in this report.

This report also benefited greatly from background papers and research provided by Dr. J. David Cummins, Dr. Howard Kunreuther, Dr. Erwann Michel-Kerjan, Ms. Karen Clark and AIR Worldwide, Dr. Joshua Epstein, Moody's Economy.com, and the advice and comments provided by the many physicians, scientists, economists, and financial services industry experts with whom we consulted throughout this project.

The views reflected in this report are those of the Financial Services Roundtable and do not necessarily reflect the policy positions of organizations and companies represented on the commission.

The superb professional staff at The Financial Services Roundtable, the Housing Policy Council, and BITS also provided valuable knowledge and expertise. We are also grateful for the time they took to review successive drafts of this report for accuracy and thoroughness.

The Roundtable is grateful for the outstanding guidance provided throughout this project by Mr. William A. Longbrake

of Washington Mutual, Inc. who is also the Anthony T. Cluff Senior Policy Advisor for The Financial Services Roundtable. He kept us organized, on schedule, and focused throughout the project.

The Roundtable also thanks Robert Litan, Vice President of Research and Policy at the Kauffman Foundation and Senior Fellow in the Economic Studies Program at the Brookings Institution for serving as the study coordinator for this project, and devoting his expertise, time and energy to its completion.

Finally, the Roundtable thanks the Cluff Fund and the member organizations of the Blue Ribbon Commission, which provided the financial support for this effort.



The United States has one of the highest per capita incomes in the world, and in no other country is it as easy to go from “rags to riches” within a very short period of time. However, Americans are also exposed to “mega-catastrophes” (Mega-CATs) which threaten our health, our lives, and the fabric of our economy and our society. Mega-CATs have many guises – devastating hurricanes, earthquakes, or floods; easily transmissible and potentially highly lethal viruses; and, since the Oklahoma City bombing of 1995 and 9/11, acts of terrorism.

As individuals and as a nation, we have difficulty thinking about, let alone preparing for, these potentially devastating events. As one expert in emergency management has so acutely observed, individuals have a hard time talking about these risks because they want to deny that they exist; if they occur, they don’t believe they will be affected; if they are affected, they “won’t be that bad”; and if they do happen and are that bad, it is tempting to believe that nothing can be done to stop them or mitigate their consequences.¹

But to refuse to talk about and discuss – and therefore confront catastrophic risk – is actually a decision to accept more damage, loss of life and harm to our health than is necessary. Americans are renowned for their “can do attitude” – and the effects of Mega-CATs, while not always avoidable, can certainly be reduced through planning and thoughtful policy. If Hurricane Katrina taught Americans anything, it demonstrated that we need to be far better prepared, both before and after major

catastrophes. We need to work together to prevent catastrophic damage, to deal with it expeditiously when it happens, and to pay for subsequent recovery efficiently, equitably and expeditiously.

The Roundtable formed this commission to address precisely these issues so that America will be far better prepared in the future for Mega-CATs. Although it is difficult to define such events with numerical precision, we know enough to make a vital distinction between relatively “routine” catastrophes – tornadoes, most floods, forest fires, and the like – which inevitably adversely affect many Americans in every part of the country throughout every year, and “Mega-CATs” like Katrina and 9/11 whose consequences not only loom large in economic and human terms in a particular city or region of the country, but also adversely affect the national economy and even psyche: interrupting and depressing economic activity, leading to a drop in national output and possibly a major disruption of financial markets and activity.

Future mega-CATs await us. Notwithstanding an uneventful (and fortunate) 2006 hurricane season, meteorologists and climatologists warn that hurricanes even more devastating than Katrina are likely in the future: category 4 or 5 storms making direct “hits” on such highly populated areas as Miami, Tampa, Houston, or New York (and elsewhere along the mid-Atlantic and in New England). Geologists see major earthquakes in the future for parts of California, Seattle, Washington, and many of the states in the middle of the country near or along the New Madrid fault in eastern Missouri and western Tennessee. In the wake of the 9/11 attacks, and the foiled plot to blow up airplanes over the Atlantic during the summer of 2006, the United States remains exposed to the risk of large scale terrorist attacks – in a worst case, involving chemical, biological, nuclear, or radiological (CBNR) weapons. And although the United States and the rest of the world so far have escaped a “pandemic flu” – a deadly virus rapidly transmitted from person to person – medical experts warn that the world remains subject to this risk, some believing a pandemic is inevitable

¹This is paraphrase of a statement made by Eric Holdeman, the director of emergency management for King County in the state of Washington, and quoted in Ripley, 2006, p. 57

within the next several years. Any one of these events would have impacts that are national in scope and could result in mass fatalities (especially a pandemic) and economic damage well in excess of \$100 billion.

This report has three purposes

1. To propose ways to improve the resiliency of our economy and society so that future mega-CATs are less costly to our nation than they otherwise would be
2. To address ways of spreading the financial and economic costs fairly, efficiently, and expeditiously
3. To offer recommendations for improving our response to and recovery from these events.

This is the final report of the Blue Ribbon Commission on Mega-Catastrophes of The Financial Services Roundtable. It follows two earlier “Interim Reports” released in the fall of 2006, one addressing ways to accelerate recovery from Hurricane Katrina and the other outlining recommendations for better preparing the United States and the rest of the world for a possible outbreak of pandemic flu.

The Financial Services Roundtable consists of approximately 100 of the largest integrated financial services companies in the United States. The Commission was comprised of 35 Roundtable member institutions, plus a number of other organizations active in the financial arena. (See Appendix C for a list of members). The members of the Commission, all of the Roundtable member organizations, and indeed the entire financial sector -- as employers of millions of people performing services that are at the nerve center of our economy (processing payments; providing credit; and storing, protecting and managing the wealth of individuals, businesses, and non-profit institutions) -- have a vital stake in the subjects addressed in this report. This is why the federal government regards the financial services industry as an integral part of the nation’s critical infrastructure, along with certain other industries, such as telecommunications, electricity and transportation.

The analysis presented in this report draws on

...meteorologists and climatologists warn that hurricanes even more devastating than Katrina are likely in the future...

multiple sources, including review of publicly available information, interviews and discussions with knowledgeable experts, and expertise of our own member organizations. Taking all of this information into account, we reach the following overarching conclusions:

- 1) **The United States could be substantially better prepared to minimize the losses from any of the kinds of mega-CATs that could strike the United States.** Doing so will require bold efforts by both the private and public sectors. While much planning already has been done -- especially among firms in the financial sector -- there is more that can and should be done to prevent future losses and to ensure continuity of essential operations.
- 2) **The costs of natural catastrophes, in particular, should be borne more through private insurance than is now the case.** This will require some additional public policy measures, consistent with market principles, at both the state and federal levels, to enhance the availability and affordability of catastrophe insurance. The federal flood insurance program requires a major overhaul to improve its actuarial soundness. The federal terrorism reinsurance program should be extended on a long-term basis, with several modifications.
- 3) **Governments at all levels, together with the private sector, can and must do a better job of attending to the human and economic needs of victims immediately after mega-CATs.** But Katrina and the earlier 9/11 terrorist attacks have given us ample warning that large -- perhaps even much larger -- catastrophes could strike any part of the United States at any time. Knowing that, it is imperative that officials at every level of government, working with the private sector, plan and test their responses to the very real and immediate needs of future victims.

² See Financial Services Roundtable (2006a) and (2006b).

SUMMARY OF RECOMMENDATIONS

The Commission members agree unanimously that the first 23 recommendations listed should be implemented promptly. Two additional recommendations attracted support from a majority of the Commission members, but there were dissenting views. The Commission considered one other issue, but reached no consensus. Some of the recommendations shown here were contained in our earlier Interim Reports.

RECOMMENDATIONS BY CONSENSUS

Reducing the Costs or Impacts of Future Mega-CATs

Government policies can minimize the costs and impacts of various mega-CATs in a variety of ways. Insurance markets must be able to price for risk in ways that give individuals and businesses economic incentives to reduce their exposure to catastrophe losses. New construction must meet state-of-the-art building codes. Public policy initiatives should provide incentives and assist with the financing of retrofitting to these codes. Appropriate federal regulation should reduce exposure to terrorism risks. The federal government should reduce exposure risk of the U.S. population to a future pandemic (and we commend those agencies which have made progress toward this end since the release of our Pandemic Report).

1. Mitigate Losses from Future Mega-Catastrophes: State and local government officials should use the following tools to reduce exposure to catastrophe losses (see pg. 35):

- a. Require state-of-the-art building codes for new construction that reflect best practices for reducing catastrophe loss exposure;
- b. Require cost-effective retrofitting measures when residences are modified substantially and otherwise encourage homeowners to invest in mitigation retrofitting; and

- c. Adopt land use policies that discourage construction in areas that are difficult to evacuate or that pose unusually high risks to personal safety.

2. Adopt and Enforce Statewide

Building Codes: FEMA should incorporate (by rule or, if necessary, through legislative amendment to the Stafford Act), the adoption and effective enforcement of statewide building codes in its Hazard Mitigation Grant Program. In addition, FEMA and the Congress should implement a preference in making pre-disaster grants to proposals by states and localities seeking support for the training of state and local building code inspectors to improve enforcement (See pg. 36).

3. Ensure Compliance with Building

Codes: States and localities should develop innovative ways to ensure compliance with catastrophe-related building codes, including (See pp. 51):

- a. Funding for an adequate number of building inspectors
- b. Requiring home sellers to disclose at the time of sale the building code that applied to their property at the time it was built.

4. Establish Mitigation Improvement

Loan Programs: Lenders, housing government-sponsored enterprises (GSEs), and insurers should work together to provide mitigation improvement loans to home owners (which the GSEs could package and sell as securities) to finance mitigation investments that will prompt insurers to reduce homeowners insurance premiums (See pg. 37).

5. Provide Tax Credits and Grants

for Catastrophe Mitigation: State and local governments should provide property tax credits and grants to homeowners and businesses that invest in catastrophe mitigation measures. Likewise, the federal government should provide income tax credits for such improvements in high-risk areas. State and local governments

should not penalize homeowners and businesses with higher property taxes on account of improvements to property values that mitigation makes possible (See pg. 38).



6. Minimize Pandemic Flu

Consequences: The federal government should implement the key recommendations outlined in our Interim Report on pandemic flu to minimize its consequences: (See pg. 41)

- a. Enhance research and development of a range of vaccine-production technologies and antiviral medications
- b. Subsidize the production of pandemic-specific flu vaccine, when it is developed, in the United States and in the developing world
- c. Take more aggressive steps to provide medical care to individuals who may contract pandemic flu
- d. Ensure that private and public sector business continuity plans are in place and continually tested and monitored.

Paying For The Costs of Future Mega-CATs More Efficiently and Fairly

The current methods of paying for mega-CATs differ by event and involve varying degrees of insurance (private and public) and disaster relief provided ex post on a case-by-case basis. Although it is not practical to adopt a “one size fits all” approach to pay for all mega-CAT costs in the future, public

policy should facilitate the purchase of insurance to cover these costs. This can be accomplished by removing impediments to funding catastrophe losses through the capital markets, and by targeting any subsidies for insurance to individuals or families of low to moderate means. Compared to disaster relief, insurance is likely to provide greater financial cushion against loss; is more effective in encouraging mitigation and appropriate location decisions (provided policy permits insurers to charge rates that are actuarially sound); and is fairer to parties who are not subject to catastrophic risks.

Accordingly, a central goal of our recommendations relating to natural catastrophes is to enhance the availability and affordability of insurance for such events, consistent with actuarial principles. That is, individuals and businesses in higher risk locations or living or operating in higher risk structures should pay more in insurance premiums than others exposed to less catastrophe risk. States can and should enhance the availability of catastrophe insurance by allowing market forces to set premiums, based on actuarial and scientific principles. A more efficient catastrophe insurance market should reduce the need for government-provided disaster relief, while providing appropriate incentives for loss prevention.

Some catastrophic events may entail such large costs and/or are so uncertain that they may not be efficiently insured solely by the private sector. Such events call for the kinds of limited government intervention listed below.

7. Broaden The Role of Capital Markets in Financing Catastrophic

Risks: Both the federal and state governments should take steps to broaden the role of the capital markets in financing catastrophic risks, in addition to conventional insurance mechanisms (See pp. 49):

- a. Congress should pass legislation establishing national standards for the issuance of catastrophe-linked securities, with regulation assigned to an appropriate federal agency (most likely the Securities and Exchange Commission);

- b. A Federal regulator, or in the absence of federal regulation, state regulators, should adopt a “use and file” regulatory system for Catastrophe (CAT)-linked securities, rather than requiring prior approval before such securities can be issued;
- c. State insurance regulators and the Financial Accounting Standards Board (FASB) should reform insurance and public accounting rules to facilitate the issuance of CAT-linked securities in the United States; and
- d. The U.S. Treasury Department should undertake a study to determine what other changes in federal and state laws and regulations would reduce barriers to the issuance of CAT-linked securities in the United States.

8. Recognize Multi-Year Reserves for Natural Catastrophes: The federal government and the FASB should recognize multi-year reserves established by insurers and other parties at risk for natural catastrophes and terrorism, by allowing annual net additions to such reserves to be deductible expenses for tax and reporting purposes. Such reserves would be restricted to paying claims for future Mega-CATs. (See pg. 52).

9. Authorize an Optional Federal Charter for Insurers: The Congress should authorize insurers, as an option, to operate under a federal charter. The availability of this option would help ensure the availability of privately-supplied catastrophe insurance by allowing market forces, guided by actuarial and scientific principles, to set insurance premiums. The insurance business has the competitive structure to permit market forces to set prices, as businesses are allowed to do in all other sectors of the U.S. economy where the market structures are similarly (or even less) competitive (See pg. 53).

10. Federal Lending to State Guaranty Funds in The Event Of One or More

Very Large Natural Mega-CATs or a Pandemic: For natural disasters or pandemics that are certified by the Treasury Secretary as posing a grave financial risk to a state’s guaranty funds, the commission urges the Congress to give the Treasury Department the authority to lend to those state funds to assure prompt payment of claims. (See pg. 54).

11. Improve The Federal Flood Insurance Program: Congress should enact multiple changes to the flood insurance program to put it on a sound actuarial basis including: phase-out subsidies in existing premiums; educate citizens in flood zones better to promote awareness on their part that they are either obligated or strongly encouraged to purchase flood insurance; prioritize the upgrading of existing flood maps; and extend the flood purchase requirement to properties financed with mortgages made by state-chartered financial institutions. In addition, Congress should raise the insurance ceilings, but only if premiums are assessed on an actuarial basis (see pg. 56).

12. Extend And Modify The Federal Terrorism Reinsurance Program: Congress should authorize federal terrorism reinsurance for commercial lines insurers on a long-term basis on mostly the same terms that exist for 2007 under the Terrorism Risk Insurance Extension Act (TRIEA), but with added coverage for group life insurance and for acts by domestic terrorists. The Commission urges the implementation of such a program as soon as possible, since the existing terrorism program expires by the end of 2007 and already commercial policies, which extend beyond December 31, 2007, are being renewed without terrorism coverage after that date (given the uncertainties about the continuation of a federal terrorism insurance program). (See pg. 59)

13. Establish a Separate, More Comprehensive and Permanent Program For Covering Losses from “CBNR” Attacks: The Congress should

establish a separate, more comprehensive and permanent program for covering losses due to an attack using chemical, biological, nuclear or radiological (CBNR) means by any party or government. Because CBNR attacks are inherently uninsurable and the responsibility both for preventing and dealing with them is uniquely a federal one, such a program should cover all losses to the insurance industry and other parties at risk. Only with such a CBNR program in place could insurers make CBNR coverage available and thus act as claims agents for the federal government. As with terrorism coverage, the Commission urges the Congress to promptly enact a separate CBNR risk program. (See pg. 64)

14. Ensure Payment of Life Insurance Policies In Case of Pandemic:

The Congress should examine ways to ensure that life insurance policies are promptly paid in the event of a pandemic, with special attention given to federal lending to state guaranty funds that pay claims of insolvent insurers. See also Recommendation 10. (See pg. 64).

Improving Response To and Recovery From Future Mega-CATs

The best way to improve the immediate response to future mega-CATs is through better preparation. Better advance planning, augmented with flexible policies after the fact, can also expedite recovery from these events.

15. Meet Liquidity Needs:

The federal government should pursue several approaches for meeting the liquidity needs of individuals and businesses in the aftermath of future catastrophes (or, in the case of a pandemic, during such a crisis) (See pg. 66):

- a. The federal government should distribute emergency liquidity, to the maximum extent possible, through debit cards rather than cash.
- b. Regulators, lenders, and the housing GSEs

should support the offering of forbearance on mortgage loans that is commensurate with the severity of damage in given areas. Financial institutions, working with consumer organizations and state and local officials, should communicate clearly any forbearance plan to all affected individuals and stakeholders.

- c. Congress and various federal agencies should modify current distribution channels for federal disaster assistance. In particular, the Small Business Administration should permit authorized financial institutions to directly offer SBA-guaranteed disaster loans (without applicants having to go through the SBA itself); the SBA should define its treatment of “duplicate benefits” to include only compensation beyond that necessary for repairs; relevant government agencies (SBA, FEMA, and HUD) should coordinate their valuations and appraisals of damaged properties; the SBA should review its underwriting standards to support lower-income borrowers and reduce delays in the origination and closing of loans after disasters; and Congress should modify requirements under the National Environmental Policy Act that may impede recovery from disasters.

- d. The Federal Reserve should be ready to fulfill its lender-of-last-resort functions (acting through financial institutions) to meet liquidity needs of the economy, or parts thereof, after Mega-CATs.

16. Authorize Non-Binding Arbitration for “Wind vs. Water” Coverage

Disputes: States exposed to catastrophic hurricane risks (such as those along the East and Gulf coasts) should authorize non-binding arbitration to resolve future “wind vs. water” coverage disputes. (See pg. 68)

17. Add Prevention and Preparedness Funding to the Stafford Act:

Congress should strengthen the Stafford Act, which authorizes post-event disaster relief,

by authorizing additional funds for disaster prevention and preparedness activities. The Congress should appropriate money for this purpose, including additional funds (on a matching basis) to states and localities in areas of high catastrophic risk to support enforcement of building codes (See pg. 69).

18. Expand Scope of Pre- and Post-Event Regional Coordination:

The federal government should expand efforts already launched by the Treasury Department to coordinate financial institution responses to catastrophes on a regional basis, by facilitating the creation of Regional Councils composed of representatives of both the private and public sectors in different parts of the country. These Councils should have a broad mission: to better prepare for a wide range of contingencies in the event of future Mega-CATs, and to assist affected regions to recover more rapidly (See pg. 70).

19. Adopt and Monitor Statewide Emergency Preparedness Plans:

All states and their major cities should collaboratively adopt, regularly update, and continuously test emergency preparedness plans for dealing with Mega-CATs (even states facing low risks of natural catastrophes are exposed to pandemic risks). Such plans should include evacuation procedures, credentialing systems (to help identify who can get into a damaged area and when), education for residents, and procedures for handling basic government functions (e.g., police and fire protection and trash pickup) in the wake of various types of Mega-CATs (See pg. 71).

20. Expand Temporary Housing

Solutions: The federal government should use a variety of temporary housing solutions, pending the rebuilding of permanent residences, following major catastrophes: mobile and manufactured homes, housing vouchers (useable anywhere throughout the United States), and trailers as a last resort. Future disbursement of any government-financed housing funds should draw on lessons learned from funds established for Louisiana and Mississippi in the aftermath of

Hurricane Katrina. To the extent feasible, future disbursement policies should use monetary incentives for individuals who make early commitments to rebuilding to help overcome uncertainties that delay decisions to return. Housing policies are critical in the wake of Mega-CATs (except in the case of a pandemic) because without housing, workers cannot rebuild, and displaced individuals cannot return (See pg. 71).

21 Establish Training Programs for Reconstruction Workers:

The U.S. Department of Labor should assist with the training of local residents (and others who may be attracted to the devastated region) to work in reconstruction-related activities immediately after future catastrophes (and thus have contingency plans for doing so). The housing recommendations listed in Recommendation #20 should help in this regard, as should the proposed Regional Councils (Recommendation #18). It is critical in the aftermath of Mega-CATs to attract labor back to any devastated area, not only to assist with the recovery, but also to provide a workforce that will sustain the economic vitality of the affected area in the future (See pg. 72).

22. Monitor and Extend “Critical Infrastructure” Emergency

Preparedness: The federal government should expand its efforts to monitor the emergency readiness of both the private and public sectors. All firms that are part of the nation’s “critical infrastructure” should launch or enhance efforts to coordinate their emergency preparedness with other sectors, and with other relevant organizations. The federal government should facilitate this cross-sector emergency planning and Congress should appropriate funding necessary to carry it out. (See pg. 73)

23. Clarify Nature and Extent of Temporary Regulatory Relief:

Federal and state regulatory agencies should provide firms subject to their jurisdiction with clarity regarding the nature and extent of temporary regulatory relief for various Mega-CATs (especially for a pandemic) so that private sectors can better prepare for them. (See pg. 74)

OTHER RECOMMENDATIONS WITH SIGNIFICANT DISSENTING VIEWS

24. Homeowners' Insurance Premiums Should Be Set By The Market:

The market for homeowners' insurance is competitive and thus rates charged by insurers should be set by the market. Where premiums are regulated, a large majority of the Commission agrees that they should be risk-based, and reflect the best available actuarial and scientific information. This not only will help ensure that such coverage is available, but also will encourage cost-effective mitigation. States that choose to subsidize the purchase of insurance by individuals of limited means should do so through direct subsidies (perhaps financed by assessments on insurance purchases made by other policyholders), rather than through "residual markets plans," which are not means-tested and the subsidies are non-transparent. (See pg. 38).

25. Federal Lending To State Catastrophe Insurance or Reinsurance Plans In The Event of One or More Very Large Natural

Mega-CATs: For events that are certified by the Treasury Secretary as beyond the ability of any state insurance or reinsurance catastrophe plans to respond without suffering substantial capital erosion, a majority of the Commission urges the Congress to authorize the Treasury Department to lend to state insurance or reinsurance funds on three strict conditions (to prevent the prospect of federal loans from discouraging sound pricing and cost-effective mitigation). In particular, in order for a state plan to be eligible for a federal loan, the Secretary of the Treasury must also determine that: (1) the state plan has been operated on a sound actuarial basis, (2) the state has adopted and is enforcing state-of-the-art building codes, and (3) insurers are able to charge risk-based premiums. Other members of the Commission disagree, and believe that the federal government should not support state insurance or reinsurance

plans because to do so would interfere with private insurance markets and thereby send inappropriate signals about the nature and extent of catastrophe risk in areas prone to natural catastrophes (See pg. 55).

The Commission also considered whether and in what fashion the federal government should sell reinsurance to state reinsurance catastrophe plans. Some members supported the idea, on the grounds that mega-Catastrophes causing damage above some threshold amount pose too great a risk for the private sector to insure by itself. Other members disagree, and believe that if the other recommendations in this Report are adopted, the private sector can handle future mega-catastrophes and that, in any event, state reinsurance plans and the availability of federally-supplied reinsurance would interfere with the proper functioning of the private market (See pg. 56).

Conclusion

It is impossible in the wake of 9/11 and Katrina to ignore the threats that Mega-CATs pose to the human and economic welfare of the citizens of this country (and, in the case of a pandemic, to citizens around the world).

We have endeavored in this report to inform policymakers and the wider public about how they and citizens themselves can reduce their exposure to losses from future Mega-CATs. By being better prepared, we can mitigate losses from the events themselves. We also outline what steps policymakers can take to enhance the availability and affordability of catastrophe insurance and how the business community and the public sector can better prepare for future emergencies. Preparation is key to improving responses to and recovery from Mega-CATs.

Given that any of the events described in this report can happen at any time, the time to act is now.

CHAPTER 2

THREATS POSED BY POSSIBLE FUTURE MEGA-CATASTROPHES



We concentrate in this report on five types of Mega-CATs: hurricanes, earthquakes, floods, acts of terrorism, and pandemic. By definition, these mega-CATs are worst-case events. One would like to think that each is also highly unlikely, and while that may turn out to be the case, the risks we run in depending upon that supposition are simply too high:

- Driven by an increase in ocean temperature due to global warming, some experts believe that large-scale **hurricanes**, potentially far more devastating than Hurricane Katrina (the costliest U.S. hurricane on record) will be more likely in the future than in the past.
- Although the exact timing is imprecise, geologists have estimates of the “return rates”, and hence the probabilities, of potential future large-scale **earthquakes**;
- Many areas of the country are subject to **floods**. Katrina reminds us all of the potentially large flood risks that exist on lands protected by levees or dams, especially in areas that also may be subject to other natural catastrophes that can trigger or aggravate floods.
- There is no scientifically defensible method for projecting the probability of future major **terrorist incidents**. (This is the primary reason why the federal government does not assess

premiums for providing insurance against those events under the current terrorism insurance program. The current program will expire on December 31, 2007, unless renewed in some form before then.);

- There is no scientifically justifiable way to predict the possibility of a future **pandemic**, although a number of scientists believe that such an event may be inevitable and will occur in the next several years.

Three important and related factors contribute to the likelihood that, for any given natural or man-made (terrorist) catastrophic act, the damage in both human and physical terms will grow over time: population growth, growing concentration of population and construction in high-risk areas, and rising property values. For example, already more than half of the U.S. population lives in coastal states, and almost 17 percent of all property value in the United States is concentrated in coastal counties of those states.³ Demographers project these ratios to increase, especially with the aging of the population and impending retirement of the baby boom generation. As a result, more people and structures will be put in harm’s way over time, although government policy may be able to affect the pace at which this occurs. The Insurance Information Institute, for example, cites the estimate of one CAT modeling firm that catastrophe losses are likely to double every decade due to continued population growth and construction.⁴

In the case of frequently occurring accidents or losses, even for most “catastrophes” as that term is defined in the insurance industry (a single event resulting in losses of \$25 million or more),⁵ it is appropriate for individuals and governments to concentrate primarily on the expected losses associated with those events, measured by the sum of the possible events multiplied by their estimated probabilities. Given the law of large numbers, the frequency of these events

³ Population data are from the Insurance Information Institute website (www.iii.org) and property values are from Mortgage Bankers Association, 2006.

⁴ See the essay “Catastrophes: Insurance Issues”, November 2006, on the website of the Insurance Information Institute, www.iii.org.

⁵ The term “catastrophe” was created by the Insurance Services Office, the industry’s leading supplier of loss data and standard policy language. In 1997, ISO increased the size threshold for defining a catastrophic event from \$5 million to \$25 million in losses.

gives decision-makers the luxury of concentrating on just the average outcomes.

This is not true, however, for ‘worst-case’ events of the type examined in this report, or for other possible worst-case outcomes, such as major wars that threaten national security. In such situations, citizens want to have assurance either that the worst-case will not happen, or if it does, how they can be at least financially (if not physically) protected against it. This is why individuals are willing to pay insurance premiums potentially well above the average or expected loss – whether in the form of a strong military in the case of national security, or insurance in the case of events like severe and expensive illnesses, natural events that could destroy one’s house, or death from any number of causes.

It is in this spirit that this report necessarily focuses on possible worst-case Mega-CATs of various types, which could threaten the lives and property of large numbers of people and businesses. We do not choose events whose likelihood is so remote and damages are so severe that threaten human existence as we know it, but instead events that, in our judgment, are sufficiently likely that they merit attention by this nation’s policymakers.⁶

In the sub-sections that follow, we give readers a better idea of the worst kinds of events with which we are concerned. In particular, we have commissioned expert modelers to project the direct physical and human damage, as well as the loss in economic output, associated with four specific natural catastrophes: two worst case, large-scale hurricanes and two earthquakes, both affecting highly populated areas of the United States. The direct losses are estimated by AIR Worldwide, and the economic losses by Economy.com, the economic forecasting division of Moody’s (which uses the direct consequence estimates of AIR Worldwide to generate the economic projections). Appendix B describes the forecasting methodology used and other assumptions made by Economy.com. It is possible, however, that the economic loss estimates shown here understate the potential follow-on economic losses to the extent they imperfectly capture the interruptions in the

production and delivery of various supplies (such as oil, other commodities, and manufactured products) to the rest of the country that would be likely in each of the simulated events (such impacts being difficult to model). Estimates of the losses from possible large-scale floods, terrorist acts and a pandemic are drawn from the available literature.

Several broad results are worth highlighting at the outset:

- The direct property losses in all of the natural catastrophe loss scenarios exceed \$100 billion, the worst event being a magnitude 7.3 earthquake in the Los Angeles area, which could result in direct, mostly uninsured losses in excess of \$700 billion.
- In all of the four natural catastrophe scenarios, U.S. economic output growth declines either modestly or substantially in the first quarter of the event, bounces back in at least two subsequent quarters due to reconstruction (financed by insurance and disaster relief), but then falls back a bit in several later quarters as the temporary boost in reconstruction fades.⁷ The greatest economic impacts are felt in the Los Angeles earthquake scenario, consistent with the largest physical damage estimates for that event.
- The economic and human losses from potential acts of terrorism – especially those involving nuclear, biological, chemical, and radiological causes – and from a future pandemic could easily be substantially larger than in any of the natural catastrophe scenarios.

Hurricanes

Of all the Mega-CATs reviewed in this report, hurricanes have been the most damaging to date. Furthermore, as shown in Table 1, with a few exceptions, the most damaging hurricanes in U.S. history have occurred in the past five years. Indeed, over 70 percent of \$110 billion in hurricane and tropic storm losses suffered over the 1985-2005 timeframe occurred in just two years, 2004 and 2005.⁸

⁶ For a wide ranging and thought provoking examination of catastrophes that could threaten human existence, see Posner, 2005.

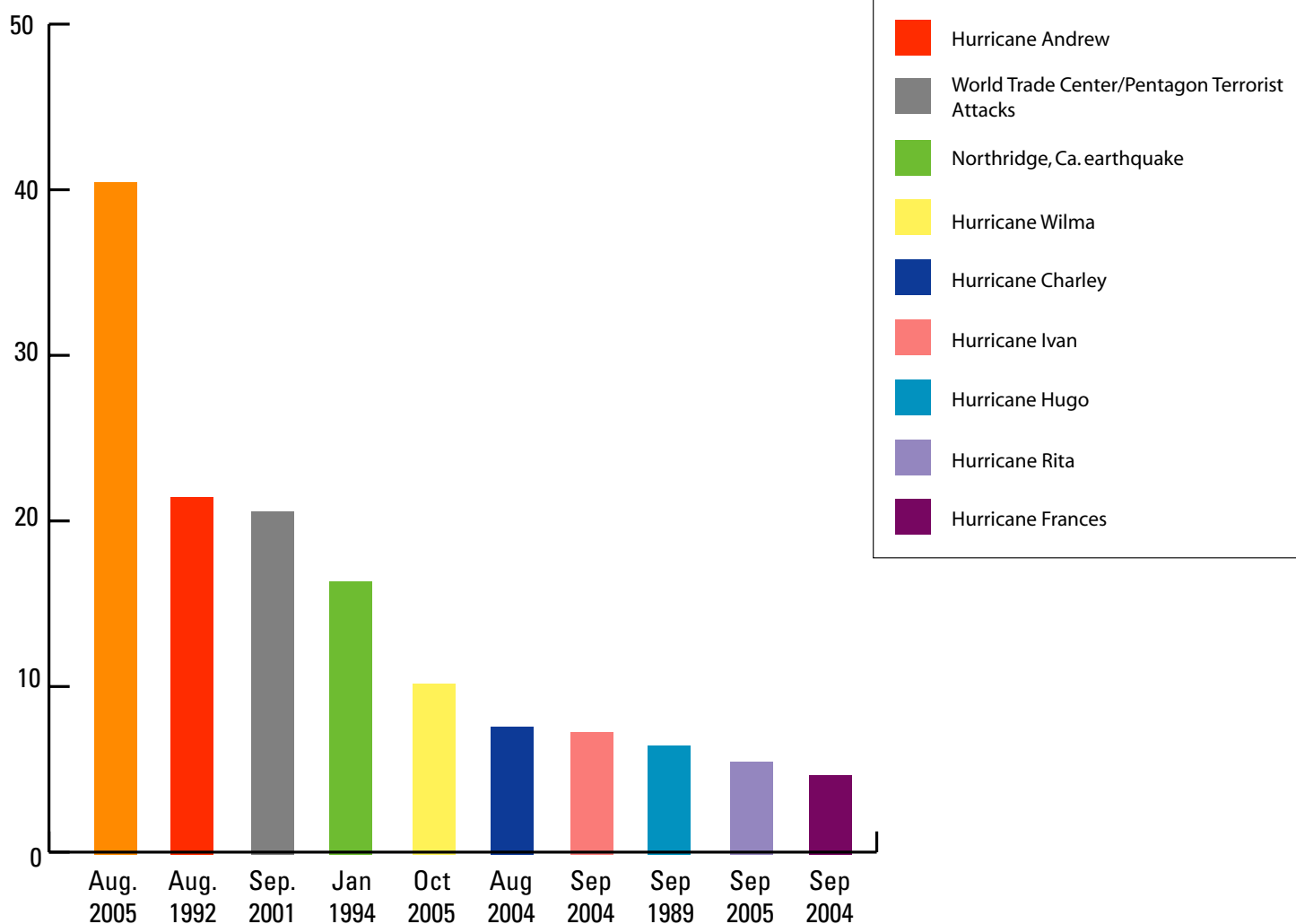
⁷ The projections assume that monetary policy is tightened during the period of reconstruction (to contain inflation) and then loosened when economic output growth falls after the reconstruction ends. Still, economic output does fall in all of the scenarios several quarters after the initial event.

⁸ Mortgage Bankers Association, 2006, p. 6.

Table 1

The Ten Costliest U.S. Catastrophes

Insured Losses, Billions of 2005 Dollars



Source: Insurance Information Institute (www.iii.org).

Hurricane Katrina, with its death toll of nearly 2,000, insured losses of approximately \$40 billion, and uninsured losses (including both direct physical damage and losses in economic output) equaling several multiples of the insured losses, may be only a harbinger of significantly worse hurricanes to come. Although the 2006 hurricane season was benign, defying most experts' predictions, most climatologists believe that the nation is currently in the midst of a cyclical upturn in hurricane activity (both in frequency and intensity) that could last for another decade or more. Meanwhile, debate

continues among the experts about whether global warming may aggravate the intensity of future storms. There is little debate, however, about the future demographic trends – rising population growth, additional construction and rising property values – that will lead to increased damage from future storms of any given intensity.

We illustrate here the projected losses from two possible future hurricanes: a category 5 hitting the Miami area, and a category 4 landing in New Jersey and proceeding northward through New England.

For purposes of each projection (and those for the earthquake scenarios outlined below), each hurricane is assumed to occur in the third quarter of 2006 (covering the time period when the projections were made). These scenarios illustrate that:

- A Category 5 hurricane striking Miami would cause more than \$170 billion in property damage, affecting or destroying roughly 1.7 million residences.
- A Category 4 hurricane striking much of New England would result in over \$190 billion in property damage, affecting or destroying approximately 4.5 million residences.

Due to increasing population and construction in these and other high-risk locations, future costs for each scenario almost certainly would be greater (possibly even if discounted back to the present at a reasonable real rate of interest). Investment in mitigation and sound zoning decisions, discussed in chapter 4, would slow the rate of increase in loss exposures, however.

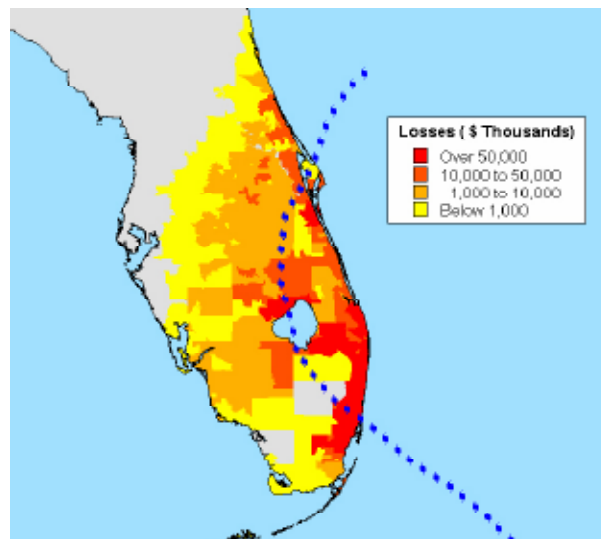
Category 5 Miami Hurricane

A Category 5 hurricane (wind speeds greater than 155 mph) hitting the Miami area and tracking north up the densely populated Florida coast is among the worst case scenarios from an insured loss perspective, given total property values in coastal counties of southeast Florida of more than \$1 trillion (as estimated by AIR). In such a storm, mobile homes in the hurricane's path would be leveled, roofs and siding could be torn away, leaving contents exposed; glazing on high-rise buildings would suffer significant damage from both suction forces and debris acting as missiles; non-engineered buildings would sustain structural damage and non-structural elements on engineered buildings would be destroyed. Water surge could cause significant additional damage to properties close to the shoreline.

Although injuries and fatalities undoubtedly would occur, the numbers would be far below those that would result from a major earthquake. Engineered structures rarely collapse in the face of hurricane force winds, and presumed evacuations would keep large numbers of people out of harm's way.

The geographic pattern of estimated losses from such a hurricane is illustrated immediately below:

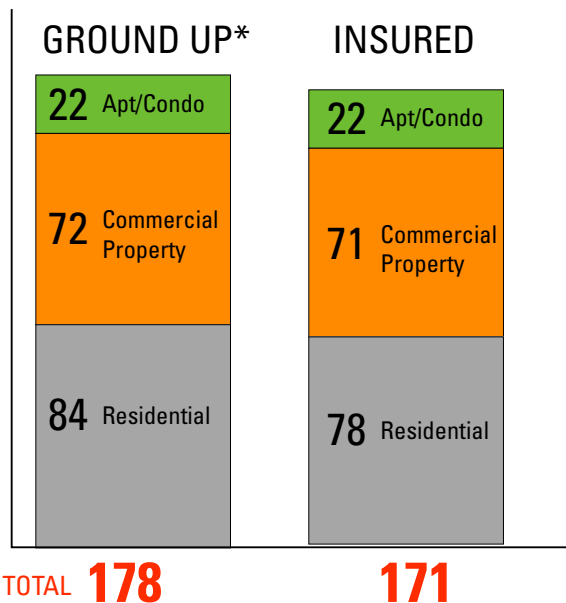
Estimated ZIP Code Level Losses from a Category 5 Hurricane Striking Miami



In quantitative terms, AIR estimates that total insured losses from this event would exceed \$170 billion. More than 1.6 million residential properties and in excess of 100,000 commercial buildings would sustain some degree of damage.

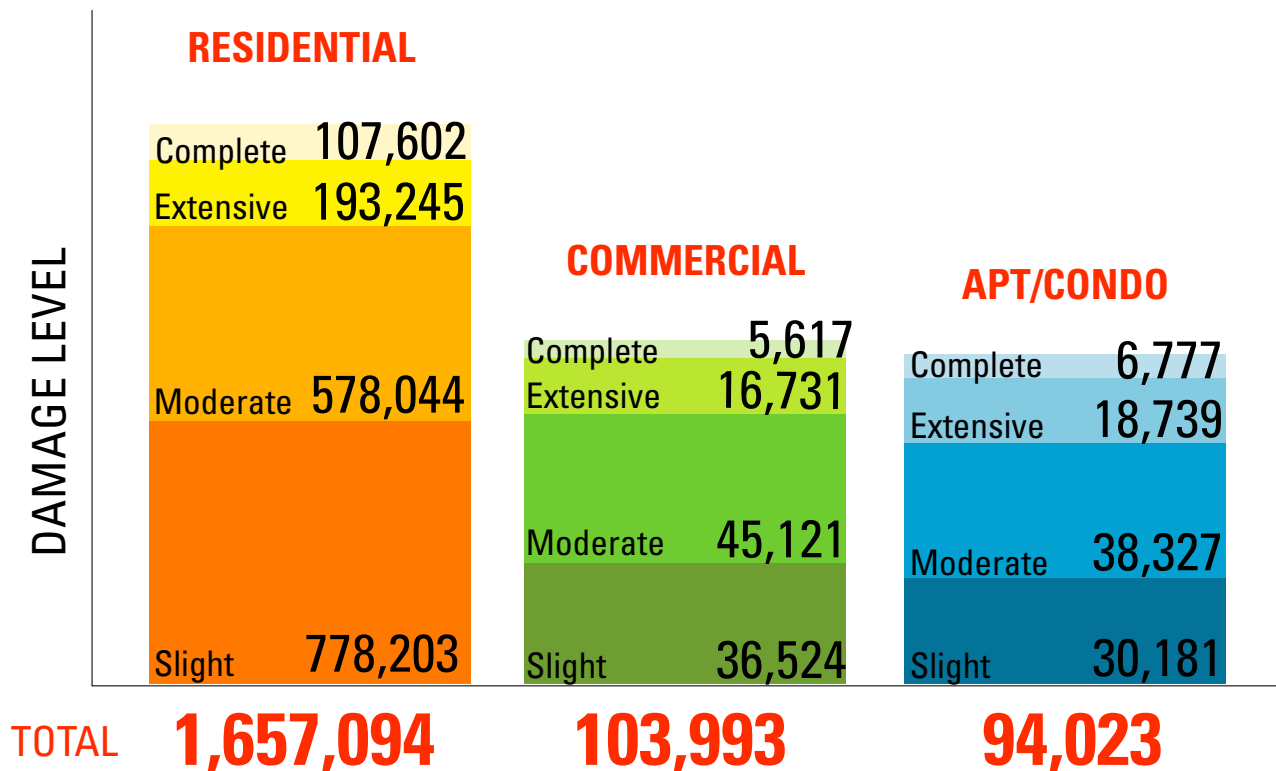
Estimated Property Losses From a Category 5-Miami Hurricane

Billions of 2006 Dollars



*Ground up loss represents damage to all on-shore property and business interruption.

Estimated Numbers of Properties Affected



Economy.com estimates that U.S. economic output and employment, relative to a baseline scenario (without the hurricane), would fall in the quarter of the event, but then bounce back the following quarter, only to fall again about a year later after the temporary benefits of the reconstruction activities end. These impacts are shown below.

Economic Damage from a Category 5 Miami Hurricane Percent Change, By Quarter, From Baseline

	0	1	2	3	4	5	6	7	8
GDP	-0.4	1.3	1.9	.4	-1.7	-2.0	-0.6	0.1	0.2
Employment	-0.2	.6	1.3	.9	-0.6	-1.3	-1.0	-0.4	-0.2

By comparison, the Congressional Budget Office estimated in January 2006 that Hurricanes Katrina and Rita combined knocked 0.5 percent off of GDP growth in the second half of 2005 (counting both the third and fourth quarters of that year), but that growth bounced back in 2006 by roughly the same amount, due to hurricane-related reconstruction [CBO, 2006].

Category 4 New England Hurricane

Since 1900, eleven hurricanes have made landfall in the Northeast. The most intense of these -- the Great New England Hurricane of 1938 (also sometimes known as the "Long Island Express") was a borderline Category 3/4 storm. Historical records indicate that millions of trees were downed, thousands of buildings were destroyed and, in some cases, entire coastal communities were swept away by storm surge. The hurricane resulted in 700 fatalities. More than 60,000 were left homeless.

Since 1938, the number of single-family homes in the Northeast has tripled; the total value of exposed properties is thirteen times higher. The population has nearly doubled and the mean sea level has risen by six inches.

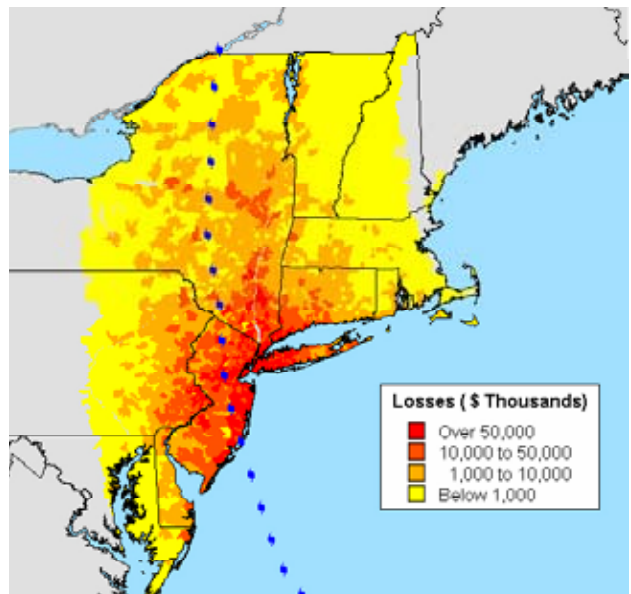
What makes New England windstorms potentially so costly is that, although they are typically less intense in terms of wind speeds than their more southerly counterparts, they affect a much larger area. The average size (radius to maximum winds) of Northeast hurricanes is almost 50 percent larger than Florida and Gulf storms.

In addition, New England storms typically travel much faster. The average forward speed is almost three times faster than storms making landfall in Florida and the Gulf. The fast forward speed amplifies the wind speeds on the right hand side of the track. It also brings hurricane force winds much farther inland. The 1938 storm caused significant damage as far inland as Worcester, Massachusetts.

AIR estimates that approximately \$7.7 trillion of insured property would be exposed to a major New England hurricane. More than \$300 billion in insured property would be located within the storm surge footprint.

AIR simulated a Category 4 hurricane that initially strikes the New Jersey coast, putting the highest concentration of property to the right of the storm track where wind speeds are highest. The map below illustrates the geographic pattern of losses of such an event.

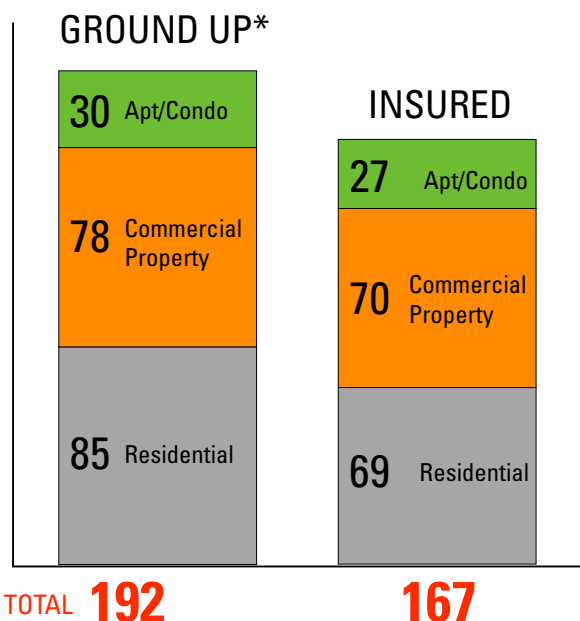
Estimated ZIP Code Level Losses from a Category 4 New England Hurricane



Given the assumed path and intensity of the hurricane, AIR estimates that insured losses could exceed \$160 billion, with more than four million residential properties and 200,000 commercial buildings sustaining some degree of damage, as shown below.

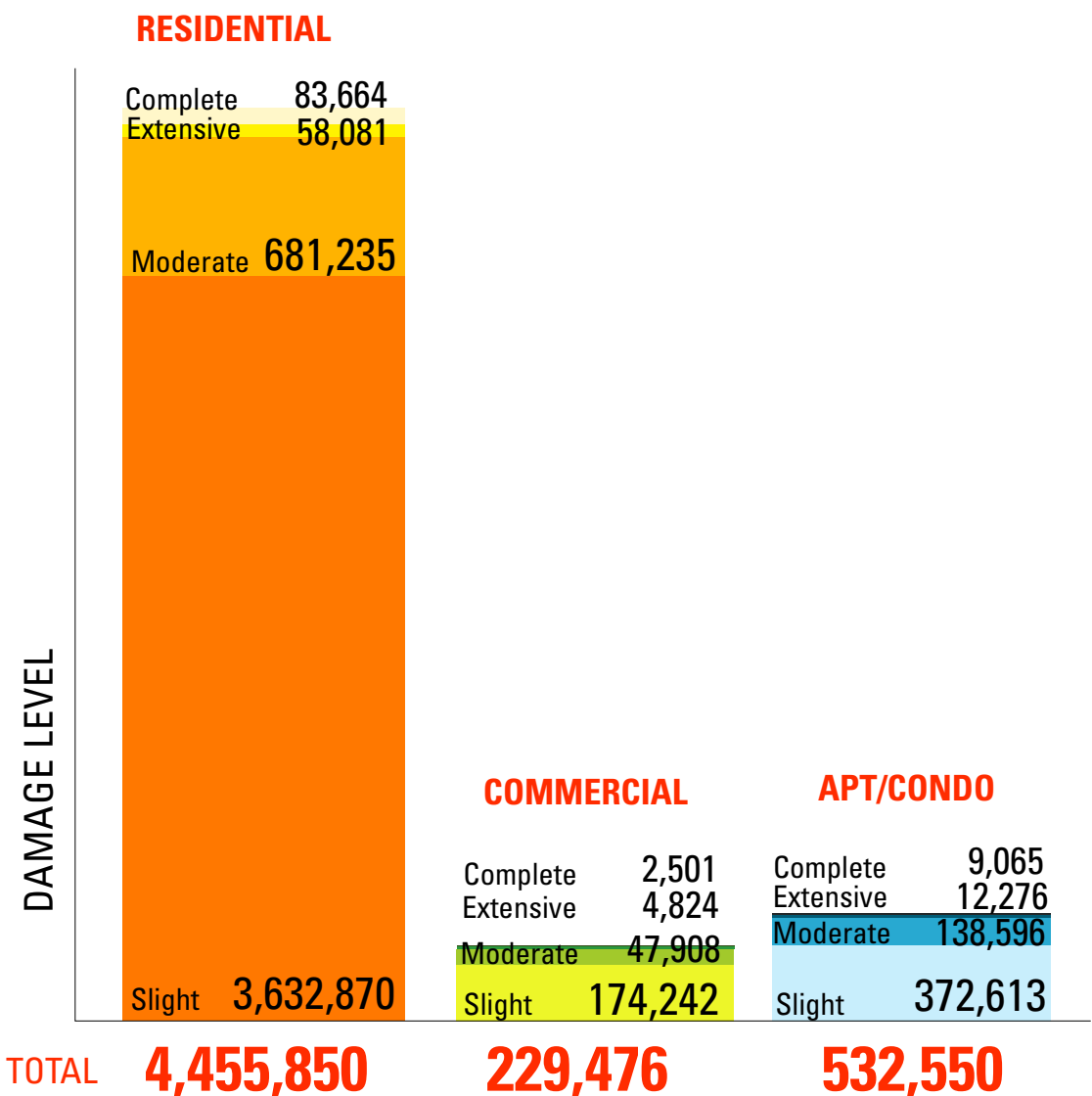
Estimated Property Losses From a Category 4-New England Hurricane

Billions of 2006 Dollars



*Ground up loss represents damage to all on-shore property and business interruption.

Estimated Numbers of Properties Affected



Economy.com estimates that, relative to baseline, U.S. economic output and employment would fall in the quarter of the event by roughly the same amount as in the Miami hurricane, but then bounce back the following two quarters (a bit more slowly than in the Miami scenario), before falling back again after the reconstruction effort fades.

Economic Damage from a Category 4 New England Hurricane Percent Change, By Quarter, From Baseline

Quarters From and After The Event (0 Being The Quarter of the Event)

	0	1	2	3	4	5	6	7	8
GDP	-.4	1.3	1.9	.4	-1.7	-2.0	-.6	0.1	0.2
Employment	-.2	.3	.9	.6	-.4	-1.0	-.7	-.2	-.1

Earthquakes

Although earthquake risk is present in almost in all states, the risks of significant damage are greatest on the West Coast and in the states along the New Madrid fault in the middle of the country, near the southeastern corner of Missouri where the last series of major quakes occurred in 1812-14.

Estimates follow of the potential damage of two earthquakes, one in Los Angeles, the other a repeat of the New Madrid episode. Each scenario assumes a specific “magnitude” (which is roughly equivalent to the commonly used “Richter scale”). These scenarios are reasonable worst case possibilities, entailing substantial damage to residential and commercial structures, and public infrastructure. In summary, the key results are:

- A Magnitude 7.3 earthquake centered in downtown Los Angeles could produce property losses in excess of \$700 billion, affecting or destroying over 700,00 residences.
- A Magnitude 7.8 earthquake along the New Madrid fault centered in Arkansas, Missouri and Tennessee would cause property losses of \$225 billion, affecting or destroying approximately 500,000 residences.
- A much larger share of the losses in the earthquake scenarios would be uninsured than in the case of the hurricane scenarios due to low take-up rates.

Los Angeles Earthquake: AIR estimated the impact of a major rupture of the Puente Hills fault, which runs directly beneath downtown Los Angeles. Such an event, simulated at magnitude 7.3, could produce losses significantly greater than a recurrence of the 1906 San Francisco earthquake.

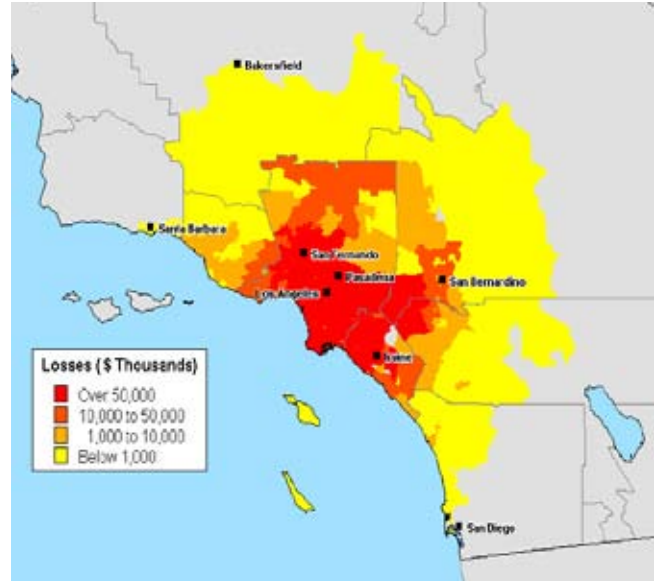
Scientists believe that the Puente Hills fault has ruptured four times in the last 11,000 years, with magnitudes ranging between 7.2 and 7.5. The energy released by such events is roughly 10 to 15 times greater than that of the 1994 Northridge earthquake, which caused economic losses in excess of \$40 billion. An earthquake along the Puente Hills fault would be

especially damaging because of the soft sediments that characterize the heavily populated Los Angeles basin. Soft soils can amplify ground shaking and when seismic waves are trapped in, and reverberate around, a basin of such soils, the damage to structures above them is likely to be severe.

The current population in the larger Los Angeles metropolitan area is nearly 13 million. AIR estimates that the replacement value of properties in Los Angeles County alone exceeds \$1.5 trillion, or approximately 3 percent of total U.S. property value. Yet despite the high hazard in California, the percentage of properties with earthquake insurance continues to fall. Currently, that figure is at 14 percent, down from approximately 33 percent in the mid-1990s, after the California Earthquake Authority, or CEA, was formed (the CEA is discussed in more detail in chapter 5).

The map below illustrates the geographic pattern of losses in the assumed Los Angeles area earthquake.

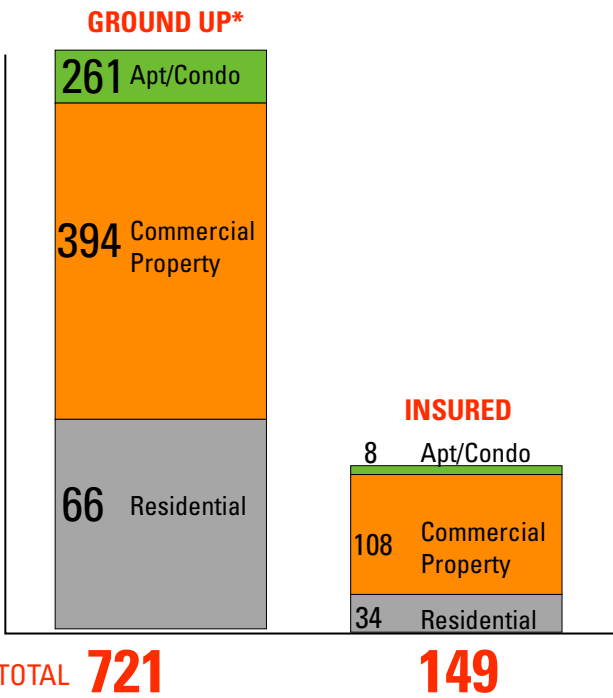
Losses from a M7.3 Rupture of the Puente Hills Fault, By Zip Code



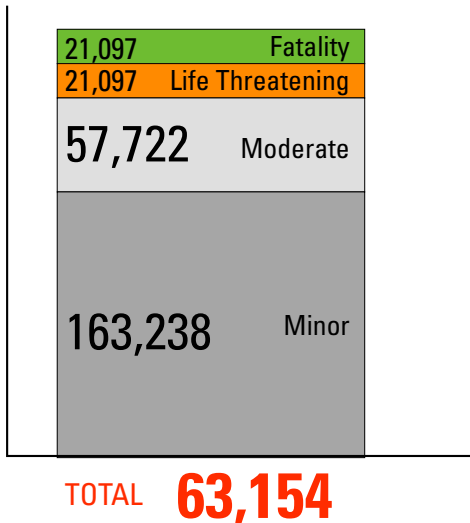
As for the quantitative results, AIR estimates that a magnitude 7.3 earthquake along the Puente Hills Fault would cause insured losses of nearly \$150 billion, but total property losses in excess of \$700 billion. These figures include both the damage from ground shaking and the fires that would be spawned by such an event. More than 240,000 people would be injured and more than 20,000 killed. Clearly, this

Estimated Property Losses From a Los Angeles Earthquake

Billions of 2006 Dollars

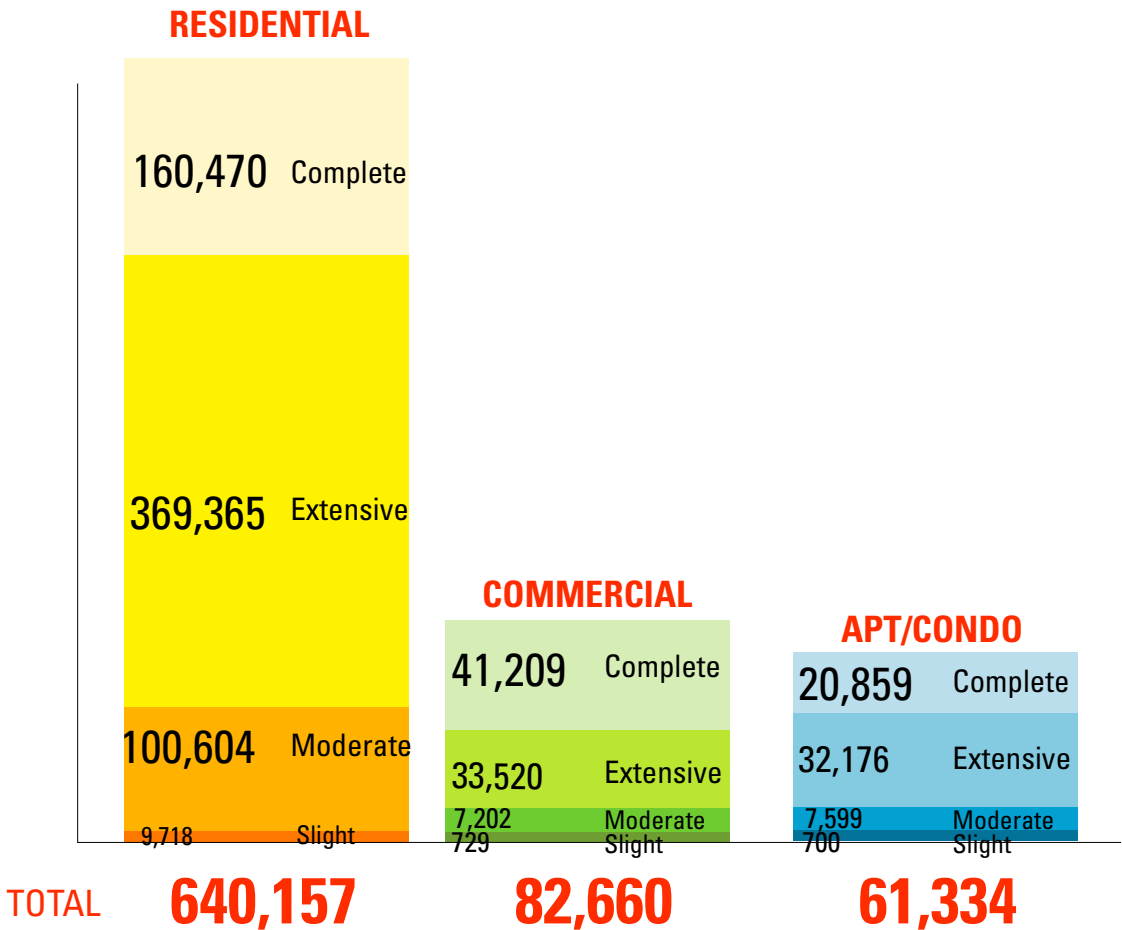


Estimated Numbers of Injuries and Fatalities



*Ground up loss represents damage to all on-shore property and business interruption.

Estimated Numbers of Properties Affected



Economy.com estimates that, relative to baseline, U.S. economic output and employment would fall in the quarter of the event by more than 1 percent, or more than double the impact than in the two hurricane scenarios, but then bounce back the following two quarters, before falling back again after the reconstruction effort fades.

Economic Damage from a Los Angeles Earthquake

Percent Change, By Quarter, From Baseline

Quarters From and After The Event (0 Being The Quarter of the Event)

	0	1	2	3	4	5	6	7	8
GDP	-1.1	1.5	1.8	.3	-1.8	-1.7	-.7	0.1	0.2
Employment	-.5	0	.8	.5	-.4	-1.0	-.7	-.2	-.1

New Madrid Earthquake

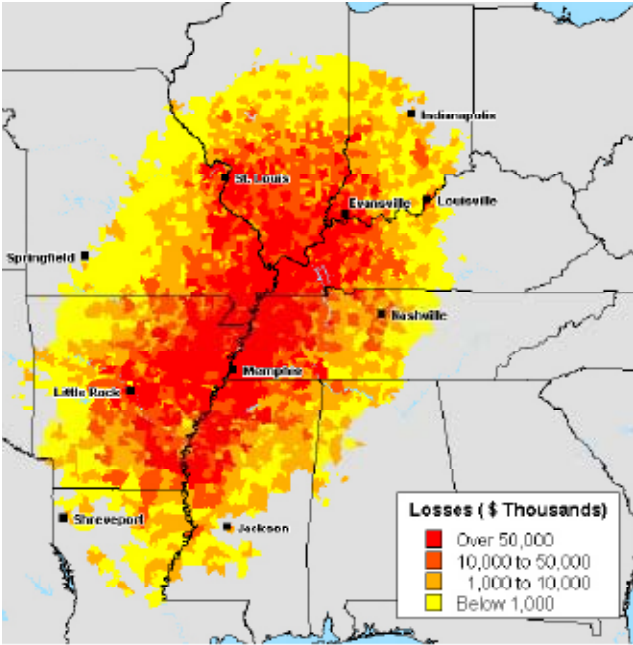
Unlike much of the West Coast, which lies along the boundary between the Pacific and North American tectonic plates where the underlying seismology is relatively well understood, there is much greater uncertainty relating to how a future earthquake along the New Madrid fault would affect the Central and Eastern parts of the United States where the impact of such an event could most accurately be felt. Still, some things are known; the dense rock of the region would mean that any earthquake along the New Madrid fault would propagate seismic energy over a much larger area than would the same magnitude earthquake in California, where rocks fractured by tectonic stresses scatter energy much more quickly. Thus, for example, while written accounts of the 1811-12 New Madrid earthquake having “rung church bells” as far away as Boston are suspect, a major New Madrid quake almost certainly would cause significant losses in St. Louis, Evansville, Memphis and Little Rock.

Putting the region at even higher risk is its older, more vulnerable building stock. Buildings in Los Angeles are much younger, and generally built to a stringent seismic building code. In contrast, most of the buildings in the central United States were constructed without earthquakes in mind.

For purposes of this report, AIR estimated the impact of magnitude 7.8 earthquake in the New Madrid

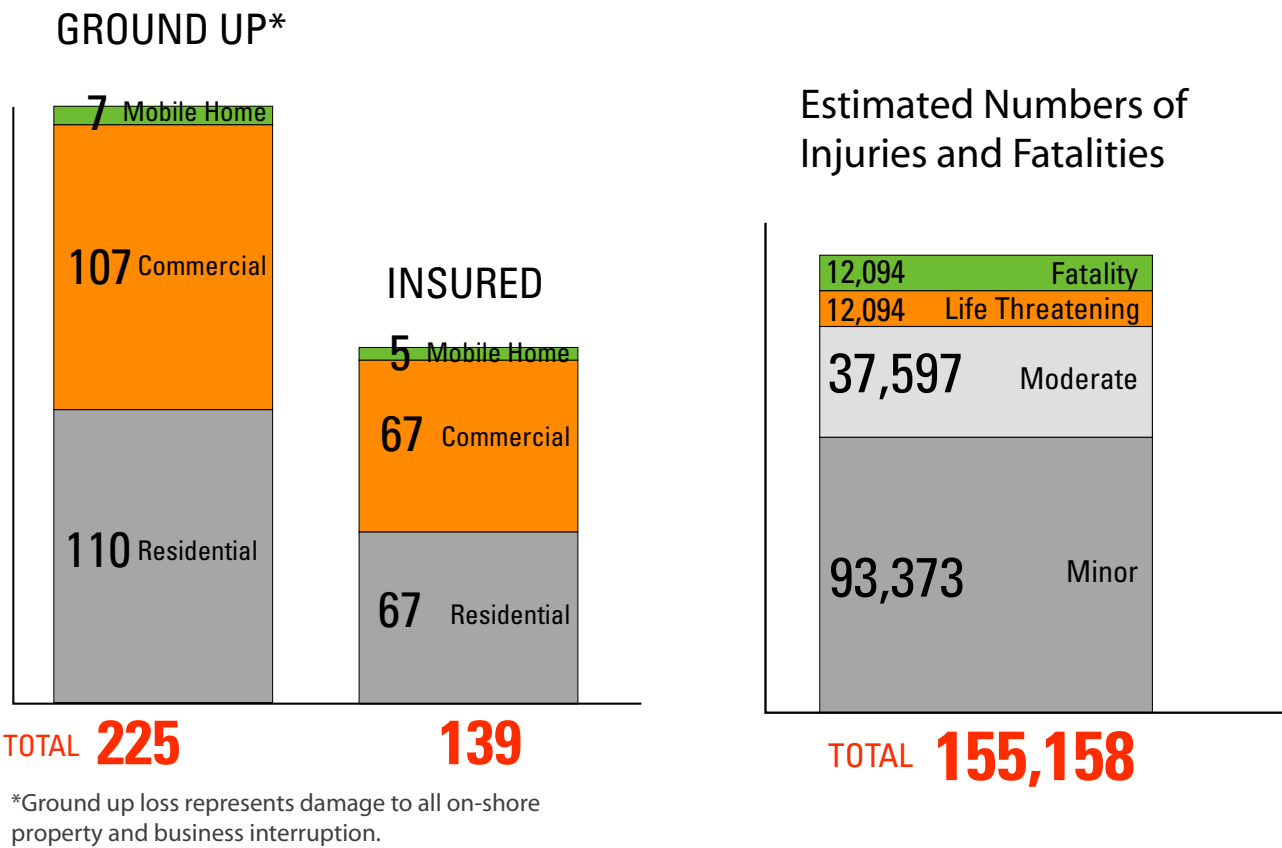
seismic zone, a reasonable worst case scenario. A map illustrating the losses in some geographic detail follows:

Estimated Losses from a M7.8 Earthquake in the New Madrid Seismic Zone, By Zip Code



Additional quantitative results are depicted in more detail in the tables below. Total property losses are estimated to be \$225 billion (of which close to \$140 billion would be insured), with roughly 12,000 fatalities, and 140,000 injuries.

Estimated Property Losses From a New Madrid Earthquake Billions of 2006 Dollars



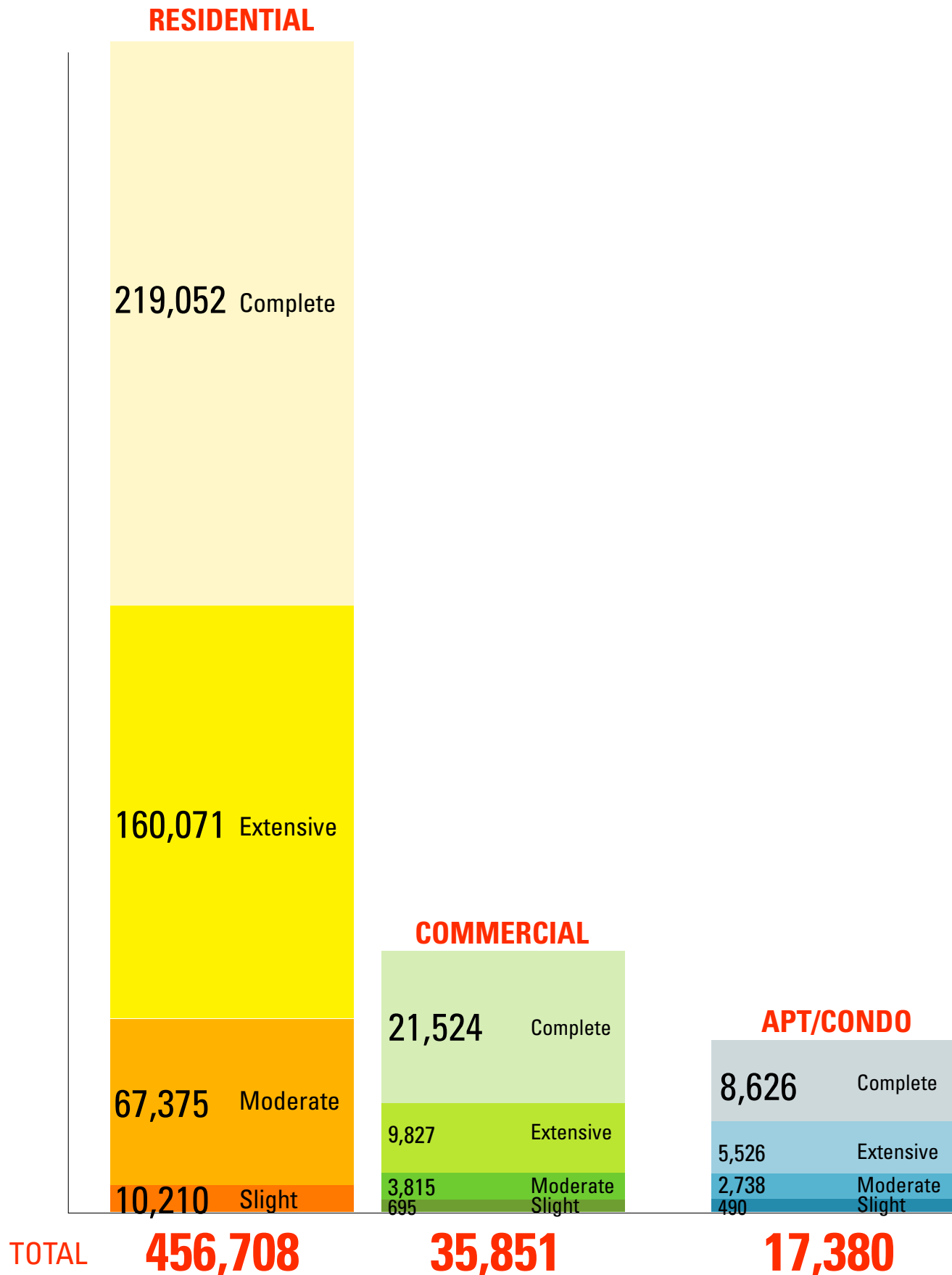
Economy.com estimates that U.S. economic output and employment from a New Madrid quake declines somewhat less than in the case of the Los Angeles earthquake, but the positive rebound effect in the next three quarters, as well as the falloff effect thereafter are greater than in the Los Angeles area quake. This seeming anomaly is due to the fact that although the total property damage in a future Memphis earthquake is projected to be less than in the case of a similar event happening in Los Angeles, many more structures would be destroyed in a New Madrid event. Accordingly, during the reconstruction phase, more construction permits would be issued, imply more intensive construction activity, and hence positive impacts on GDP and employment (until that activity wanes, and then the positive impacts reverse).

Economic Damage from a New Madrid Earthquake Percent Change, By Quarter, From Baseline

Quarters From and After The Event (0 Being The Quarter of the Event)

	0	1	2	3	4	5	6	7	8
GDP	-8	2.7	3.4	0.6	-3.4	-3.5	-1.3	.2	.4
Employment	-.3	.7	1.7	1.1	-.8	-1.8	-1.3	-.4	-.2

Estimated Numbers of Properties Affected



Floods

Many floods occur throughout the United States each year, and for those who purchase flood coverage, the damages (up to specified ceilings) are covered by the National Flood Insurance Program (NFIP). On average, roughly \$2 billion are collected in flood insurance premiums each year, which is roughly equivalent to annual losses from routine floods.

In this report, however, we are concerned with the extraordinary floods, the infrequent events that generate much larger losses. The flood associated with Katrina and the breach of the New Orleans levee system, for example, is an obvious example, generating flood insurance claims in excess of \$20 billion (and total property damage considerably higher, reflecting the fact that many properties in the region did not have any flood insurance, or were under-insured).

Other floods in the past have had large-scale consequences. The 1993 Mississippi River flood entailed extensive water damage all along the river. The Mississippi River flood of 1927 also was especially devastating, particularly in the New Orleans area (though the affected regions were not as built up and populated as they are today).

Looking ahead, the United States remains exposed to future mega-flood scenarios, and not just along the Mississippi and other large rivers. California's Central Valley, which hosts one of the nation's prime locations for agricultural production, is also highly prone to flooding. Because of extensive population growth and related construction over time, future floods in the region could have catastrophic impacts, especially given the poor condition of the state's levee system. In November 2006, California voters approved nearly \$5 billion in state borrowing to repair and strengthen the levees, which span 1,600 miles (in conjunction with federally constructed levees). This followed an earlier \$500 million appropriation by the California legislature for emergency levee repairs [Ritter, 2006].

Terrorism

Since the early 1990s, and of course especially since the infamous 9/11 attacks, the United States has continued to live with the threat of acts of terrorism, both from domestic and foreign origin, as have other countries.

The 9/11 attacks were by far the most serious, causing nearly 3,000 deaths and insured property losses (at 2006 prices) of almost \$36 billion [Valverde and Hartwig, 2006]. The U.S. government has mounted a major anti-terrorism campaign since then, and claims to have foiled numerous terrorist plots in the process. The most publicized example is the reported attempt in August 2006 by terrorists to hijack and blow up ten commercial aircraft flying from the United Kingdom to various points in the United States.

By numerous accounts, the United States remains exposed to multiple types of terrorist attacks, the most deadly and costly of which would involve chemical, biological, nuclear, or radiological (CBNR) means. A small nuclear bomb, for example, could wipe out all of lower Manhattan, not just the buildings that are likely to replace the World Trade Center. A subgroup of the American Academy of Actuaries has estimated that a weapon of mass destruction deployed by terrorists in New York could cause insured losses of over \$700 billion [McCarter, 2006]. Terrorist attacks using various types of biological weapons could result in massive numbers of deaths and injuries.

The Pandemic Risk

In our Interim Report on Preparing for Pandemic Flu, we cited widely available public information documenting the tragic consequences that could befall this country, as well as the entire world, if a major outbreak of pandemic virus occurs. In the United States, as many as 2 million people could die; worldwide the death toll could exceed 300 million. The economic consequences also could be severe, with U.S. output declining potentially by more than \$500 billion, world output by \$2-3 trillion. Further,

the Insurance Information Institute has estimated that life insurance claims could exceed the typical annual claims cost level by more than \$130 billion, losses that could threaten the capital bases and even solvency of a number of insurers [Weisbart, 2006]. These are alarming prospects and they illustrate why the pandemic risk is one of the most serious of all the Mega-CATs we review in this report.

The great unknown is whether and when a pandemic may occur. Notwithstanding this uncertainty, in light of the stakes involved, when we released our Interim Report we called on the U.S. government to mount a more aggressive effort on multiple fronts than it had planned to reduce the human and economic impact of a pandemic should it occur:

- Additional research on alternative ways to manufacture a vaccine perfectly matched to the particular virus more rapidly than is possible using current egg-based methods

- Additional research on antiviral medications; production subsidies for vaccines manufactured here and in developing countries
- Various steps to provide both institutionalized and home-based medical care for infected individuals.

To the federal government's credit, additional progress on some of these fronts has been made since our report was issued. We describe this progress in chapter 4 on mitigation. However, there is a long way to go. Perhaps the greatest challenge confronting the nation now is complacency. A mutation of an existing flu virus could occur at any time, in or outside the traditional fall-winter flu season. We cannot afford to let our guard down just because another flu season has passed without a pandemic outbreak.



Mega-CATs, by definition, have highly significant human and economic consequences. Financial institutions and the services they provide are heavily affected by such events and highly relevant to achieving all three of the objectives of this report: reducing losses, efficiently compensating for losses, and mounting effective response and recovery efforts. Indeed, this is in large part why the financial services industry has been deemed to be one of the 17 sectors designated by the federal government as part of the nation's "critical infrastructure."

In the wake of a disaster, victims and those who come to help or rescue them need:

- Immediate access to means of payment – often cash, but also various forms of electronic payment, such as credit and debit cards
- The ability to liquidate certain of their financial investments, notably in securities and mutual funds, in order to fund immediate living expenses
- The freedom to stretch out their payments on any loans they may have
- Prompt payment of claims from the insurance policies they have bought to protect them financially precisely against such events.

All of these needs became especially apparent in the immediate aftermath of Hurricane Katrina. At the same time, lessons have been learned from that experience, some of them already implemented by federal policymakers, others reflected in recommendations advanced in this Commission's Interim Report on Accelerating the Katrina Recovery. In chapter 6, we summarize those recommendations that remain relevant and applicable to various types of mega-CATs (not only hurricanes).

Financial Sector Disaster Planning

Two events over the past several years before Katrina hit impelled the financial sector and the regulators who oversee it to intensify their efforts to plan for the worst. The first was Y2K, an event that was known in advance with certainty, and one that could be, in the large scheme of things, readily (though expensively) addressed. Financial institutions and other enterprises (and the government) knew that many of their complex computer systems would not work when the new millennium arrived unless software was reprogrammed to handle the date change. The necessary effort was expended in this country, and elsewhere around the world, and the widely feared breakdown of the financial and economic systems here and abroad never occurred. Nonetheless, backup plans were developed by the financial sector in particular to prepare for a worst case – one in which counterparties with whom they regularly dealt did not successfully upgrade their systems, and thus were unable to operate in some fashion.⁹

BITS – a nonprofit consortium of many of the largest financial institutions and which is part of The Financial Services Roundtable – was formed in 1996. BITS' mission, in part, includes being helpful in coordinating the financial services industry's information technology needs, and especially to help ensure that the sector continues to function in various types of emergencies and unforeseen events.

⁹ The banking agencies belonging to the Federal Financial Institution Examination Council (FFIEC) learned a great deal from the Y2K experience and issued a report on the subject. See www.occ.treas.gov.

The 9/11 terrorist attacks were examples of the kind of events for which BITS was created, and they served as the second catalyst for intensified contingency planning by the financial sector, which was a primary target of the terrorist attack in New York. Nearly 3,000 people were killed. And although some financial operations were interrupted – the New York Stock Exchange was closed for several days – the firms that were most affected remarkably found ways to quickly resume operations at other locations, often with the aid of their competitors and suppliers.

Nonetheless, the attacks brought home to financial institutions and their regulators the vulnerability of many financial institutions and organizations to significant interruption in their activities. Several responses occurred. First, some organizations decentralized their operations, while others strengthened their redundancies (especially their backup databases).

Second, the financial sector experienced the consequences of the interdependence among the firms in the industry, the telecommunications infrastructure, and other critical sectors of the economy, and which clearly demonstrated the need for more and better coordination of plans for responding to various sorts of crises. One outcome was the formation in 2002 of the Financial Services Sector Coordinating Council for Critical Infrastructure Protection and Homeland Security (FSSCC). The FSSCC is the focal point for engagement by the financial services industry on critical infrastructure protection and homeland security, and is the primary interface with the Treasury Department, financial regulators, and other government agencies. The FSSCC works closely with the Federal Banking Infrastructure Information Committee (FBIIC), an interagency coordinating body consisting of representatives from all of the federal financial regulators and chaired by a senior official from the Treasury Department.¹⁰

BITS and the FSSCC have taken the lead in interacting with other key sectors of the economy

Third, even before Katrina, BITS recognized the need to coordinate preparedness efforts across industry lines within well-defined regions.

on which the financial sector in particular depends – notably, electricity and telecommunications. These organizations, and the Roundtable, have produced several policy statements on these issues.¹¹ BITS also has worked closely with the Federal Reserve and firms in the telecommunications industry to assure resiliency of the telecommunications network under various contingencies. All of this work proved especially helpful to the industry in the wake of Katrina.

Third, even before Katrina, BITS recognized the need to coordinate preparedness efforts across industry lines within well-defined regions. For example, working with the U.S. Treasury and the city of Chicago, BITS helped form ChicagoFIRST, a consortium of financial and other private sector organizations and local and federal officials to simulate and prepare for major mega-CATs or other large-scale emergencies. Similar regional efforts have been launched in Dallas, Houston and Minnesota. The importance of regional cooperation is further underscored in our recommendations in chapter 6, where we urge the formation of regional councils to facilitate both pre-event preparedness planning and post-event response and recovery.

Fourth, BITS has undertaken a series of other important initiatives. It has developed emergency communications tools for use by financial institutions and other firms. It has developed best practice guidelines for operations in emergencies, including guidelines for telecommunications resiliency and recoverability of critical records in the event of a power failure affecting financial service firms. Members and leaders of BITS have also made numerous public presentations and provided Congressional testimony to raise awareness among the public and policymakers of the interdependence

gov/y2k/2000-2b.pdf.

¹⁰ For details of the FSSCC's activities, see its website, www.fsscc.org.

¹¹ These can be found at www.fsscc.org and www.bitsinfo.org. For a detailed description of the contingency planning activities of BITS, the FSSCC, and FBIIC, see Financial Services Roundtable (2006b), pp. 46-53.

of different sectors of the economy, and the steps taken by the financial sector in particular to ensure continued operations under a wide range of contingencies.

Lessons from Katrina

Hurricane Katrina was a natural disaster of unprecedented scale, and entailed property damage substantially exceeding that of the 9/11 attacks. Although the inadequacies of the governmental response in the immediate aftermath are well documented, less is known about the largely successful, though partially improvised, response of nation's financial sector. We documented that response in considerable detail in our Interim Report on Accelerating the Katrina Recovery. Here we summarize some of the key actions taken by the financial sector and identify the most important lessons learned from that experience, which lay the foundation for the recommendations outlined in chapter 6 to better prepare for future Mega-CATs.

The Need for Cash: Katrina illustrated that one of the first things individuals and businesses will seek out in the wake of a disaster is cash. Since many bank branch offices may be closed or inconveniently located, automatic teller machines (ATMs) become the central means for distributing cash. But in some natural disasters, even ATMs may be rendered inoperable for various reasons: because the structures in which they are housed are severely damaged, access to them is impeded, or electric power that is needed to operate them has been knocked out. None of these impediments, however, are likely to affect ATMs in geographic areas outside the immediately affected areas, or in events such as a pandemic (assuming the electricity and telecommunications facilities continue to function).

The Katrina experience, therefore, suggests the importance of a two-pronged liquidity strategy for future disasters. One element is to rely more heavily on debit cards for distributing emergency relief to victims in the immediate area damaged by the event. In fact, shortly after Katrina, FEMA introduced debit cards with balances of up to \$2,000 to victims. Although this experiment appeared to work initially, it quickly became plagued with fraud, as many

individuals found ways to receive multiple cards, while others were not able to receive any. We believe, however, with the reforms discussed in chapter 6, distribution of some emergency assistance through debit cards remains a good idea, although even debit cards will require the continued functioning of telecommunications and electricity networks. This underscores the criticality of efforts by those sectors and their regulators to be ready to implement backup plans for continued operations under a wide range of scenarios.

Hurricane Katrina was a natural disaster of unprecedented scale, and entailed property damage substantially exceeding that of the 9/11 attacks.

The other essential part of any emergency liquidity program is to ensure that ATMs in locations in and near affected areas are stocked with cash. This is easier to do for hurricanes, for which there is typically several days' warning, than for any of the other Mega-CATs considered in this report. But even where warning is not possible, the Federal Reserve System, perhaps working with the military, can quickly stock ATMs in the immediate aftermath of a major event (or during one, in the case of a pandemic). Indeed, working with the Federal Reserve System, banks in the Gulf region affected by Katrina had area ATMs fully stocked and were able to serve the needs of customers for funds. Many branches of area banks also stepped in to provide assistance.

There are likely to be special liquidity needs in the event of a future pandemic, when many individuals will want cash for emergency spending should they venture outside their homes. One of the lessons from the extensive country and financial sector wide pandemic exercise conducted in the United Kingdom in October, 2006 was that the closure of some bank branch offices was to be expected given the shortages of personnel (which could also affect the operation of ATMs). Furthermore, banks may not be able to replace expired debit and credit cards during a pandemic outbreak. U.S. banks and other financial institutions (such as brokerage offices) should take these lessons to heart and devise plans for keeping bank office closures to a minimum.

Insurance Services: Katrina underscored the importance of the insurance industry both to the planning for and response to natural catastrophes. Indeed, if the recommendations that should enhance the availability and affordability of catastrophe insurance (consistent with actuarial soundness) are adopted, the industry will become even more important before and after future catastrophes.

Insurance plays an essential role in catastrophe planning if the premiums that are charged fully reflect the risks of damage associated with catastrophes (assuming these risks can be assessed). Premiums price risk, and as such, are the primary signals by which individuals and businesses can make decisions related to catastrophic risks – about where to locate, and what measures to undertake to prevent (or mitigate) damage.

Insurance also plays a critical role as claims are settled in the aftermath of catastrophes. The more rapidly those claims are paid, the more quickly individuals



and communities can recover. In the case of Katrina (and Rita), insurers pre-positioned their claims adjusters and prepared their home offices for the massive numbers of claims that were certain to be filed. After the hurricanes hit, the industry dispatched those adjusters to the region en masse. Thousands of these individuals worked day and night to get policy payments quickly into the hands of policyholders.

At this writing, virtually all homeowner claims for damages caused by Hurricanes Katrina and Rita in Louisiana and Mississippi have been resolved, resulting in total settlements exceeding \$15 billion. Total Katrina-related claims – for damage to commercial, residential and vehicles – had reached \$38 billion by mid-May 2006.¹² As of February, 2007, only claims against a few insurers, affecting roughly one percent of all policyholders in the Gulf area, remained open.

Nonetheless, lawsuits were filed against insurers in both Mississippi and Louisiana over the issue of policy coverage. As discussed further below, coverage for flood damage under the National Flood Insurance Program is limited by law, while homeowner policies explicitly exclude coverage for damage caused by flood or storm surge, which by all accounts, was a major factor in causing coastal damage during Katrina (and Rita). The flood exclusion was specifically upheld in a ruling by the U.S. District Court for the Southern District of Mississippi in April 2006. In November, 2006, however, the U.S. District Court in Louisiana ruled that the flood exclusion provisions in some policies in that state were “ambiguous” with respect to “man-made” flood disasters, or the failure of the New Orleans levee. (Other policies were found clearly to exclude both natural and man made floods.) At this writing, this ruling remains on appeal.

Even where water damage exclusions are supported by the courts, factual issues can arise in a small fraction of total claims: how much damage was caused by wind (which is covered under the standard homeowners’ policy), and how much was due to flood or storm surge (which is only covered under the federal flood insurance program)? Since the legal process can take time to resolve any such disputes, we recommended in our Interim Report on Accelerating the Katrina Recovery that resolution of these disputes could best be expedited if the affected states were to establish emergency, non-binding arbitration programs for resolving the small portion of all claims still in dispute. We also recommended that state and federal judges should sit on these arbitration panels and expeditiously bring about a resolution in these disputes.

¹² Information supplied by the Insurance Information Institute.

We still believe these recommendations are appropriate, and ideally should be institutionalized as one way of addressing the longer-run policy issues entailed in the “wind vs. water” disputes (see chapter 6 of this report). Indeed, the state of Mississippi has been sponsoring a highly successful claims mediation system since Katrina (with the Insurance Information Institute reporting that as of mid-October, 2006, 82 percent of the 3,000 cases voluntarily submitted for mediation had been settled).

Some have suggested that disputes over the causes of storm damage could be avoided by requiring homeowners’ (and commercial property) insurance policies to cover “all hazards,” or both wind and water damage, from whatever cause. Yet, as we discuss in chapter 6, this deceptively simple solution to coverage disputes is fraught with its own problems. A better approach, in our view, is to reform the flood insurance program – to make it actuarially sound, and if premiums are set on a sound actuarial basis, to raise the flood insurance ceilings.

Loan Forbearance: The mortgage industry, working closely with consumer organizations and the housing Government-Sponsored Enterprises (Fannie Mae, Freddie Mac, and Ginnie Mae), quickly formed a Mortgage Working Group after Katrina to deal with a problem that is likely to reoccur in future Mega-CATs: the inability of many victims to service their mortgages in the wake of massive destruction of their homes, with the attendant inability to find work in new locations while deciding whether to return to the damaged area.³ There were no manuals on how to go about this, nor had any financial institutions in any area before had to cope with an event of this magnitude. In our Interim Report on Accelerating the Katrina Recovery we recommended that certain of the practices the Mortgage Working Group eventually developed be formalized and used after future catastrophes. We advance in chapter 6 a specific recommendation toward this end.

Securities and Mutual Fund Redemptions: For those victims who needed access to the capital markets to provide liquidity after the disaster, the system worked well. Once securities brokers or mutual funds were contacted, they were able to quickly process redemption requests. The main challenge for individuals making these requests was finding access to a telephone or the Internet to contact their broker or fund. This underscored the critical interdependence between the financial sector and the electricity and telecommunications networks, a topic we address in chapter 6.

Ensuring Adequate Communications and Electricity Post-Crisis: The New York area electricity blackout in 2003 and later Hurricane Katrina in 2005 amply demonstrated the extent to which all sectors of the economy – including the financial sector – are dependent on the functioning of the electricity and telecommunications networks. This is true even for banks, which by regulatory requirement must have backup electricity generators. Banks and other financial institutions depend on the telecommunications network, which in turn, also requires electricity.

Summary of Lessons Learned

The major lesson applicable to the financial sector from the events reviewed thus far is that there is no substitute for being prepared. The participants in the financial sector know how important they are to the functioning of our economy and society, and thus are doing everything they can to enhance their resiliency and reliability in the event of various Mega-CATs. Further, they realize that they are not alone. Our modern economy and society are interconnected. The financial sector cannot operate unless other sectors – especially telecommunications and electricity -- continue their operations; hence the need for cross-sector or cross-industry collaboration and planning. Our recommendations relating to business continuity during and after major Mega-CATs, outlined in detail in chapter 6, follow from these basic lessons.

³ The Mortgage Working Group consisted of representatives of the following parties: the Mortgage Bankers Association, the Housing Policy Council of The Financial Services Roundtable, the Consumer Mortgage Coalition, the Coalition for Fair and Affordable Lending, the National Home Equity Mortgage Association, individual lenders, and the Government-sponsored Enterprises (GSEs).

CHAPTER 4

REDUCING THE COSTS AND IMPACTS FROM FUTURE MEGA-CATs



The first line of defense against catastrophes – given that most cannot be prevented (a key exception being acts of terrorism) – is to minimize or “mitigate” losses in event they occur. Homeowners obviously have a personal interest in minimizing their exposure to catastrophic losses. Not only can such measures reduce losses themselves, but often by protecting against structural damage to their houses, they can preserve valuable contents.

Prevention by individuals also benefits others. In the technical language of economists, mitigation has “positive externalities” – that is, it benefits society as a whole, and because it does, society has an interest in encouraging individuals to invest in mitigation.

- Where some homes are damaged this can lead to damage to neighboring houses and structures, as well as human beings. For example, when roof shingles or entire roofs are torn off by hurricane-force winds, flying debris can cut a wide swath of damage to anyone or anything close by.
- Reduced losses from catastrophic events mean lower insurance losses as well as reduced payments for disaster relief for those who lack insurance or are under-insured. In addition to the benefit of lower rates for homeowners’ insurance, which in turn can mean higher

insurance take-up rates for individuals living in areas susceptible to catastrophic damage, a second benefit would be a reduced disaster relief burden on taxpayers.

In principle, mitigation can be accomplished in three ways: (1) through charging actuarially appropriate insurance premiums, which give firms and individuals economic incentives to take cost-effective measures to limit their exposures to loss; (2) through government mandates, including building codes for new properties or for significant upgrades to existing properties, and zoning rules; and (3) through government incentives (subsidies) for property owners to adopt mitigation measures. Historically, mitigation mandates and incentives are established at the state and local level, although in the case of floods the federal government (which is the source, after all, of disaster relief) uses various incentives and mandates of its own to encourage states and localities to limit flood damage.

Insurance pricing and government mandates/ incentives can reinforce each other and thus are more appropriately viewed as complementary approaches to mitigation, rather than as substitutes. Indeed, there are several reasons why insurance pricing alone may not generate an optimal amount of mitigation, and therefore why some sort of government mandate or incentive may be appropriate.

1. Individuals often underestimate the risks of catastrophes. The underestimation of risks not only can lead to under-investment in mitigation, but also helps explain why many individuals do not purchase catastrophe insurance (for earthquakes and floods, as two examples).¹³
2. Individuals or firms who accurately perceive the probability of a certain event nonetheless may not invest sufficiently in mitigation because they

¹³ For academic support for this view, see Kunreuther, 2006.

believe there is little they can do to minimize losses. As we discuss in greater detail, while this is untrue for natural catastrophes, it may be the case for acts of terrorism (where attacks may take unanticipated forms or whatever a firm or an individual may do to insulate themselves against attack may have no effect).

3. Individuals may lack the financial wherewithal to finance an investment in mitigation, or have access to capital only at very high cost (which would make the investment uneconomic).

Below we discuss how losses from particular types of Mega-CATs can be reduced; what systems of mitigation mandates and incentives currently exist to promote mitigation; the shortcomings in those systems; and our recommendations for improvement.

Our central conclusion is that, with the possible exception of acts of terrorism, further investment in mitigation is likely to be cost-justified in geographic areas exposed to a reasonable risk of future Mega-CATs, and to the country as a whole in the case of a pandemic. That is, even taking account of the low probability of these high consequence events, the expected benefits of further mitigation are likely to outweigh the costs.

Mitigating Natural Mega-Catastrophe Losses: Status, Problems, and Cures

The steps necessary to mitigate damage from various catastrophes are well understood. Some of the basic elements that homeowners can take are summarized in the accompanying box.

A HOMEOWNER'S GUIDE TO REDUCING EXPOSURE TO CATASTROPHE LOSSES¹⁵

Reducing Damages From Hurricanes

- Secure roofs to the structure: sealing joints, ideally installing a roof that can withstand high winds (protecting the structure and surrounding structures)
- Secure windows: installing high impact window systems or shutters
- Patio doors: ideally should be non-sliding
- Garage door and track systems: ideally, high-wind resistant
- Installing hurricane straps or clips where roof framing meets the studs
- Clear objects on properties, such as overhanging branches and outdoor furniture, which could become flying debris in a windstorm (and thus damage neighboring properties)

Reducing Damage from Earthquakes

- Contents mitigation: attaching movable objects, fixtures, lighting, bookshelves and large appliances, and storage units to wall frames

- Fastening water heater to the wall (otherwise damage could lead to fires or flooding that damage the structure and neighboring structures)
- Structural mitigation: tying the structure together (bracing of cripple walls in wood structures and anchoring of the foundation with a bolt and tying it to the structure)
- Other structural steps: ensuring that other components of the house (including the roof, garage, additions to the house, and the chimney) are strong enough to withstand earthquake damage

Reducing Flood Damage

- Elevating the structure, if possible
- Building homes with flood resistant materials
- Bracing roof trusses and gable end walls
- Applying wood adhesive where the roof decking and support meet

¹⁵ Many of these measures are listed in Wharton (2007).



Are mitigation investments worth it? In 2005, the U.S. National Institute of Building Science addressed that question in a major study of FEMA mitigation grants made over a ten-year period from 1993 through 2003. It found that the \$3.5 billion in grants extended during this period produced benefits of \$14 billion, in terms of future losses that would be avoided in the event of hurricanes, flood or earthquakes. In other words, the benefits exceeded costs by a ratio of 4:1. Further, the study estimated that these grants are likely to save over 200 lives and prevent almost 4,700 injuries over a 50-year period.¹⁶

Whether this 4:1 ratio of benefits to costs should justify mitigation against an uncertain event depends, of course, on the probability that the event will occur and that the structure will suffer damage. To a risk-neutral person (one who is indifferent to risk), a 4:1 benefit-cost ratio means that the expected benefits (which take account of the likelihood of suffering a loss) will exceed costs if the probability of suffering damage over the period for which the mitigation is effective is 25 percent or greater. The threshold probability is even lower for most individuals who are averse to risk, as most are.

The cumulative probability that a homeowner will face damage and how long he or she expects to stay in the home, and where it is located, will influence the homeowner's judgment as to whether a mitigation investment is worth it. For many individuals who do not intend to stay in their current homes for more than a few years, even in relatively high risk locations, it may not make economic sense to invest

in significant, costly mitigation upgrades to existing structures (the calculus is different for new homes, where mitigation can be more cost effectively built into the home at the outset). But for many other homeowners who expect to remain in their homes for a long time, mitigation makes sense even if homes are located in areas of modest risk (such as those located in inland areas exposed to moderate winds from hurricanes).

From a social point of view, however, the calculation looks very different, and more compellingly justifies mitigation. Most homes are built to last for many decades, if not more than a century. Measured over this span of time, mitigation probably makes "dollars and sense" even for existing structures located in areas of modest risk, and certainly makes sense for properties along the Gulf and Atlantic coasts, for much of California and the state of Washington, and probably in many mid-south and mid-west states that could be affected by an earthquake along the New Madrid fault. The long time horizons involved for residential structures, which will be owned by multiple owners over many decades, provide a strong justification for some mandatory mitigation measures, such as building codes and zoning rules.

Recommendations for Improvement

There are multiple challenges that must be overcome in order to reduce future losses from natural catastrophes. Local and state governments must use the multiple tools they have at their disposal to prevent damage to structures in their jurisdictions. The Federal government can and should provide incentives to encourage this. Insurance pricing must fully reflect the risks of specific structures in specific locations, so that owners have economic incentives to invest in mitigation. And the private sector should work with the housing government-sponsored enterprises (GSEs) to develop financing instruments that can help owners overcome their inability or resistance to spending funds on mitigation investments.

We discuss each of these steps in greater detail in this section, beginning with steps that state and

¹⁶ U.S. National Institute of Building Science (2005).

local government officials can take. It is at the state and local levels, after all, where building codes are established and enforced, and where zoning decisions are made about where and what type of construction can take place. Our central recommendation is that all states and local governments – but especially those in jurisdictions facing high risks of natural catastrophes (hurricanes, earthquakes and floods) – need to put catastrophe loss mitigation high on their agendas.

Mitigate Losses From Future Mega-Catastrophes

In particular, states and local governments must require that new structures are built according to state-of-the-art building codes.¹⁷ There is substantial evidence that the use of modern hurricane-resistant building codes could reduce future catastrophe damages significantly, and specifically could have had a major impact in cutting the property losses from Katrina. Moreover, housing experts on our Commission believe that “building to code” would lead to greatest benefits for lesser natural catastrophes.¹⁸

Although many states have statewide building codes, many do not or jurisdictions within them have not brought their codes up to the statewide standard (a notable example being the Florida panhandle, where the Building Commission voted in July 2006 against making hurricane shutters and impact resistant windows and doors mandatory for new construction). Before Katrina, both Louisiana and Mississippi did not have a statewide building code aimed at reducing hurricane-related losses. Since Katrina, Louisiana has rectified this situation, but Mississippi has not (although a number of counties in southern Mississippi have adopted building codes).

It is almost always cheaper to build cost-effective mitigation into houses as they are constructed than to retrofit them. However, state and local governments can require owners, when they apply for permits to make significant improvements to their homes, also to implement at least some mitigation measures. In

addition, state and local governments can educate and encourage homeowners to invest in such measures even without other significant modifications to their homes. Our suggestion relating to mitigation improvement loans outlined shortly should address the objection that some homeowners might lack the resources to undertake such cost-effective investments.

Then there is the issue of zoning, and where it is appropriate and sensible to permit construction. Policymakers concerned about minimizing losses – both human and physical – from future catastrophes can apply a simple principle to zoning decisions: do not permit construction in areas where it will be difficult in the future to evacuate those who live or work there, or that pose unusually high risks to personal safety (such as land on or along a major earthquake fault or near bodies of water that have repeatedly overflowed their banks due to flooding). To be sure, this principle is easier to apply where no construction has yet taken place than where catastrophe has struck and victims (and perhaps the government officials who represent them) want to rebuild in the same locations. But especially in the latter situation, where nature has signaled the danger involved, it is a principle to which local officials should adhere.

Recommendation #1: State and local government officials should use the multiple tools available to them to mitigate losses from future Mega-CATs:

- a. **Require state-of-the-art building codes for new construction that reflect best practices for reducing catastrophe loss exposure;**
- b. **Require cost-effective retrofitting measures when residences are modified substantially and otherwise encourage homeowners to invest in mitigation retrofitting; and**
- c. **Adopt land use policies that discourage construction in areas that are difficult to evacuate or that pose unusually high risks to personal safety.**

¹⁷ The International Code Council (www.iccsafe.org) is the industry leader in model building code development, and its International Residential Code is currently in use in 45 states and Washington, D.C. The National Fire Protection Association (NFPA) also develops fire-specific codes.

¹⁸ See the Insurance Information Institute's website, www.iii.org, for further information.

In the past, the federal government has helped states and localities carry out these responsibilities. We recommend that it continue and extend its efforts in this regard.

FEMA currently has statutory authority under the Stafford Act to provide funding to the states to encourage hazard mitigation as part of post-disaster relief. The current Hazard Mitigation Grant Program (HMGP) has two tiers. States with what the agency deems to be a standard mitigation program in effect at the time of the disaster are eligible for an additional 7.5 percent of the total post-disaster grant. States with an enhanced mitigation plan at the time of disaster can receive additional post-disaster funding of up to 20 percent of the disaster relief awarded. The amounts available under both of these tiers provide a monetary incentive for states to adopt effective mitigation plans.

Adopt and Enforce Statewide Building Codes



A central problem with FEMA's current tiered system is that adoption of a statewide building code currently is not a mandatory element of either the standard or the enhanced mitigation plan. In other words, states can currently qualify for FEMA mitigation grants without doing one of the most important things that can be done to reduce disaster damage: adopt (let alone enforce) a statewide building code.

Accordingly, we believe it is essential that the adoption and effective enforcement of current state-of-the-art statewide building codes be built into the HMGP. This can most easily be implemented if FEMA were to expand (by rule, or if necessary, be authorized to do so through legislation amending the Stafford Act) the current two-tier program to include additional tiers of funding, depending on the level of the state's mitigation plan, as approved by FEMA, and the adoption and enforcement of a statewide building code.

The new program should be no more costly than the current two-tier system, because the post-disaster funding of up to 20 percent would not change. But a finely tuned program with incentives closely tied to the level of mitigation and enforcement would provide a more effective federal "carrot" for states to adopt and enforce state-of-the-art building codes.¹⁹

FEMA also implements another hazard mitigation effort, the "Pre-disaster Mitigation Grant Program" (PDMG). Under this program, specific mitigation projects proposed by state and local governments are eligible to receive additional support, beyond the formulaic support of the HMGP.

Another important step that could augment FEMA's monetary incentives for mitigation at the state level would be for FEMA to include a preference for grants that it proposes for Congressional funding under the PDMG for those supporting the training of state and local building code inspectors.²⁰ Such grants would facilitate the enforcement of the building codes themselves. Congress, in turn, should adhere to this preference in appropriating funds under the PDMG.

Recommendation #2: FEMA should incorporate (by rule or, if necessary, through legislative amendment to the Stafford Act), the adoption and effective enforcement of statewide building codes in its Hazard Mitigation Grant Program. In addition, FEMA and the Congress should implement a preference in making pre-disaster grants to proposals by states and localities seeking support for the training of state and local building code inspectors to improve enforcement.

¹⁹ Such a formula has been publicly supported by the Insurance Building Code Coalition and our Commission hereby adds its support to the idea.

²⁰ This suggestion also has been made by the Insurance Building Code Coalition, and we add our endorsement to it.

Ensure Compliance With Building Codes

As already implied, it is essential not only for states and localities to adopt state-of-the-art building codes, but to enforce them. Yet enforcement is spotty throughout the country. For example, the Wharton Risk Center (2007) notes that only a small number of communities (approximately 1,000 of the roughly 20,000 that participate in the national flood insurance program) participates in the Community Rating System (CRS), which uses the Building Code Effectiveness Grading Schedule (BCEGS) to score communities on the adequacy of their building codes generally and their enforcement. Certainly, one reason for uneven enforcement of buildings codes is the difficulty many localities have in funding them when so many other local needs put demands on limited local revenues.

The federal financial support for local building inspections that we have recommended should help the states in this regard. States themselves should give higher priority to helping localities fund their building inspectors. But given the limitation of local resources, states should experiment with other ways to achieve or induce compliance with building codes.

One useful measure would be to require home sellers to disclose the building code that applied to their property at the time it was built. This would enable buyers, and their real estate agents, to know the standards that governed the construction of the home. States and localities could facilitate home buyers' understanding of these codes by publicizing "plain English" explanations of building codes applicable during different time periods, especially as they relate to protection against catastrophes (hurricanes on the East and Gulf coasts, earthquakes in the West and other earthquake-prone areas of the country).

Recommendation #3: States and localities should develop innovative ways to ensure compliance with catastrophe-related building codes, including:

- a. **Provide funding for an adequate number of building inspectors**
- b. **Require home sellers to disclose at the time of sale the building code that applied to their property at the time it was built.**

Establish Mitigation Improvement Loan Programs

One impediment to investment in mitigation is the difficulty that many homeowners may have of financing the up-front cost of making any required upgrades (such as those listed earlier), or at least the resistance homeowners may have to paying these costs out-of-pocket.

The financial industry can help solve this problem by developing new "mitigation mortgages," or lending instruments with maturities and interest rates comparable to those they now offer in financing first and second residential mortgages. Such loans would

Of course, homeowners are unlikely to take advantage of new mitigation financing arrangements unless their homeowners' insurance company provides premium discounts for mitigation investments.

be marketed for individuals seeking loans to finance mitigation upgrades to their existing structures. For new structures, the costs of mitigation can be added to the initial mortgage (ratings of the ability of homes to withstand wind, water, or earthquake damage would help stimulate interest in obtaining such mortgages).

The housing government-sponsored enterprises – Fannie Mae, Freddie Mac, and Ginnie Mae – should accelerate the development of these mitigation loans by offering to guaranty and purchase them from the originating lending institutions and then securitize the pools of multiple loans.

Of course, homeowners are unlikely to take advantage of new mitigation financing arrangements unless their homeowners' insurance company provides premium discounts for mitigation investments. Many homeowners' insurers already offer these discounts, which they are driven to offer by the forces of competition (as discussed in more detail shortly). But with more financing available for mitigation investments, the demand for policies with

such discounts should increase, thereby stimulating further competition among insurers to offer them. In the meantime, we strongly encourage all insurers offering homeowners' coverage to actively market the discounts they do offer for mitigation investments, and compare them to the costs of the investments themselves (or perhaps more relevant, to the annual cost of servicing any additional debt taken on to finance these investments).

Recommendation #4: Lenders, housing government-sponsored enterprises (GSEs), and insurers should work together to provide mitigation improvement loans to home owners (which the GSEs can package and sell as securities) to finance mitigation investments that will prompt insurers to reduce homeowners insurance premiums.

Provide Tax Credits and Grants for Catastrophe Mitigation

State and local governments can encourage their residents to invest in mitigation through still other means: tax incentives and grants. For example, states that are exposed to hurricane risk should follow Florida's example in providing grants to homeowners in especially high-risk locations. Under Florida's program, homeowners can request inspections, at no charge, of their homes and receive recommendations for how to reduce exposure. Some funds are available for matching grants for retrofitting, depending on the insured value of the structure and the homeowner's income.

Alternatively, states and localities, as well as the federal government, should provide tax incentives or other innovative arrangements to encourage mitigation. For example, the city of Berkeley, California (which is exposed to earthquake risk), is encouraging homebuyers to retrofit newly purchased homes through a transfer tax rebate. The city levies a 1.5 percent tax on property transfers, but up to one-third of this amount can be applied to seismic upgrades during the sale of the property. To contain the costs of any tax-related mitigation incentives, state or local governments might offer them only to homeowners in specific areas, such as those within a few miles of the coast.

At a minimum, state and local governments should not penalize homeowners for investing in mitigation. This could happen where such investments lead to higher property values (a result that would be encouraged by adoption of ratings systems). The state of California has recognized this problem. In 1990, voters there passed Proposition 127, which exempts seismic rehabilitation improvements to buildings from property tax reassessments. Other states where catastrophe risks are different could do the same for investments to mitigate hurricane damage.

Recommendation #5: State and local governments should provide property tax credits and grants to homeowners and businesses that invest in catastrophe mitigation measures. Likewise, the federal government should provide income tax credits for such improvements in high-risk areas. State and local governments should not penalize homeowners and businesses with higher property taxes on account of improvements to property values that mitigation makes possible.

Homeowners Insurance Premiums Should Be Set By The Market

As noted at the outset of this chapter, economic incentives for property owners to invest in mitigation, either on or after purchase, are as important (some would say more important) as government mandates. The most directly related economic incentives for mitigation are the premium discounts that a competitive market will drive insurers to offer for such investments. Competition induces insurers to classify policyholders by the claims risk they pose. If insurers in a competitive market did not offer lower (actuarially and/or scientifically based) premiums for steps that policyholders take on their own to reduce the losses they will suffer, and thus claims they will make in the event of future catastrophes, then other insurers will step in to make those offers. In this way, competition in the insurance market plays an important role in reducing losses from catastrophic events.

Accordingly, the best way to ensure that insurers will charge risk-based premiums is to let the market and

thus competition set the insurance rates. As discussed below, the market for homeowners' insurance has all the characteristics of a competitive market, and thus should not be subject to any rate regulation. If, however, states continue to regulate premiums, they should permit insurers to set rates on a risk-based basis, using the best available actuarial and scientific information. Only a risk-based system will provide economic incentives for homeowners to adopt cost-effective mitigation measures on their own.

Of course, risk-based insurance pricing, by definition, requires that rates be considerably higher in locations with high catastrophe risk, and especially for properties that were not built to withstand significant damage from a hurricane or an earthquake. It is unrealistic and indeed undesirable, however, to expect that everyone who can't afford risk-based premiums in high-risk locations must move to other locations.

Policymakers at the state level typically have responded to the concern about insurance affordability in two ways, both of them problematic. One approach is to suppress insurance premiums below actuarially or scientifically appropriate levels. This is counter-productive for the states where this occurs, since it would discourage mitigation and thus lead to unnecessarily larger costs when future catastrophes do occur. The recent Wharton Risk Center Report on Mega-CATs documents that Southeastern states in particular tend to require approval of homeowners' insurance rates rather than simply permit insurers to "file and use" their rates. Prior approval systems are more subject to rate suppression than "file and use" systems.²¹

The second approach that some states have taken to respond to the affordability problem in high-risk areas is to create "residual markets" facilities or plans to service the insurance needs of those who cannot or will not purchase insurance in the "voluntary" market. The premiums for these "residual markets" plans, however, typically do not fully reflect the risks of the properties insured, and thus indirectly subsidize the purchase of the insurance. In addition, the plans typically accept "all comers"; that is,

Only a risk-based system will provide economic incentives for homeowners to adopt cost-effective mitigation measures on their own.



although they are designed to help individuals of limited means, they typically are available to anyone, even individuals who could easily afford the insurance in the voluntary market, but who simply want to get it at a cheaper, subsidized, price. The subsidies come from other homeowners and owners of commercial properties, since their insurance companies typically are assessed to cover any losses suffered by the residual markets plan.

Given their subsidized rates and availability to all, it is not surprising that in high-risk states where premiums in the voluntary market have grown rapidly, residual plans have grown rapidly as well. Citizens Property in Florida has become that states' largest homeowners' insurer. Its counterpart, in Louisiana, also experienced tremendous growth. Louisiana Citizens Property Insurance had 136,000 policyholders at year end 2006, up from just 11,000 before Katrina.

Very little or any of the subsidies that are typically part of residual plans is transparent. Individual purchasers do not know the extent to which they are being subsidized. Similarly, although homeowners and commercial enterprises with policies in the voluntary market know how much of their premium goes to underwriting any losses incurred by the

²¹Wharton Risk Center (2007). The Report specifically notes regulators in Florida and Texas have denied insurers' applications for rate increases, in contrast to the more permissive approaches taken by regulators in Louisiana and Mississippi, where the report speculates regulators appear more concerned about ensuring availability of coverage. Wharton Risk Center (2007).

residual insurer in any particular year – the surcharge is clear, after all – they do not know on an actuarial basis (over the long run) the extent to which they are being required to subsidize those with policies underwritten by the residual insurer. Nor are the policyholders in the voluntary market likely to know how much of their subsidy is going to people like them – those who can afford insurance in the voluntary market, but choose the cheaper, subsidized insurance from the residual insurer instead.

There is a fairer, more efficient way to subsidize the purchase of homeowners' insurance for states (or localities) that may want to make such insurance more affordable for residents that have limited means. Rather than run the subsidy through opaque residual markets plans, where the magnitude and the destination of the subsidies are not transparent, states (or the federal government, as the case may be) that want to provide subsidies should do so directly, under well-defined criteria based on the income and/or value of the individual's residence. Such direct subsidies could be financed by a surcharge on purchasers of catastrophe coverage in the voluntary market, as is now the case with residual markets plans. But unlike those plans, direct subsidies would be transparent and as suggested here, means-tested. Furthermore, they would be determined in a democratic fashion, by votes of legislators rather than by the unelected officials who may administer residual markets plans.

Recommendation #24:²² The market for homeowners' insurance is competitive and thus rates charged by insurers should be set by the market. Where premiums are regulated, a large majority of the Commission agrees that they should be risk-based, and reflect the best available actuarial and scientific information. This not only will help ensure that such coverage is available, but also will encourage cost-effective mitigation. States that choose to subsidize the purchase of insurance by individuals of limited means should do so through direct subsidies (perhaps financed by assessments on insurance purchases made by other policyholders), rather than through "residual

markets plans," which are not means-tested and the subsidies are non-transparent.

Terrorism

Since 9/11, the U.S. government has initiated action on several fronts to reduce the risks of terrorist attacks on American soil. Perhaps most important, intelligence has been beefed up and reorganized; suspicious financial transactions have been monitored, and in some cases, accounts of terrorist organizations have been frozen; and inspections of individuals, goods and vehicles entering the United States have been considerably expanded. Not all of these measures have been without controversy. But their continuation or refinement is outside the scope of our expertise.

However, there is one area in which our member organizations do have expertise: the pricing of risk. In particular, we believe that through the premiums charged for commercial property insurance, it may be possible to encourage the owners of at-risk properties (such as iconic buildings that may be targets of terrorist attacks) to make certain investments that reduce the consequences of any terrorist incidents, and may even deter them in the first place. For example, owners of buildings with modern air filtration systems are less exposed than other structures to certain types of biological terrorism. Concrete barriers, video surveillance and other safety programs can help insulate a structure from bomb blasts and so on. Over time, commercial insurance underwriters should be able to improve their databases so they can make better actuarial estimates of the extent to which these various investments can reduce claims from different types of terrorism. As they do, insurance pricing should be a useful adjunct to, and even replacement for, government mandates relating to the mitigation of terrorist-related property losses and even human consequences.²²

Insurance markets will not be able to perform this valuable function, however, unless insurers themselves can count on being able to survive financially a major terrorist attack (or attacks). Since

²²This recommendation is the first two of the non-unanimous recommendations of the Commission, where there was significant dissent by one or more members. These non-unanimous recommendations are listed at the end of Chapter 1.

²²See chapter by Robert E. Litan and Peter Orszag in O'Hanlon, 2002.

the frequency and magnitude of such incidents are not suitable to actuarial estimation, this means that large-scale losses from terrorist incidents are not insurable by the private market alone. Some kind of government backstop mechanism for such losses is required. Since 2002, the federal government has had such a mechanism in place – the Terrorism Risk Insurance Program (as amended in 2005) – but this system expires at the end of 2007. Already some commercial insurers are renewing their 2007 policies for certain properties without terrorism coverage, since there is no assurance that the federal terrorism risk insurance will be continued. In chapter 5, we recommend that a long-term terrorism insurance system be implemented as soon as possible both to eliminate any short-term uncertainty about continuation of the program, and to provide a stable commercial insurance environment over the long run. Only then will insurance pricing be able to play a role in encouraging investments that can mitigate, and possibly deter, terrorist incidents.

Minimize Pandemic Flu Consequences

In our Interim Report on pandemic risk, we offered 22 recommendations for minimizing the potentially horrific consequences of a major pandemic. They included measures to:

- Minimize the spread of the virus once it was identified (through more research into vaccine production methods and subsidies of production facilities);
- Limit the human health consequences of the pandemic, through more antiviral research; provide more medical equipment and wider training of personnel to use it; encourage greater dissemination of information about self-care; and
- Limit the interruption to business and government operations, through better planning and coordination by both the private and public sectors.

Of particular importance, unlike the natural Mega-CATs discussed in this report, pandemic risk is global.

The pandemic virus, or any virus which may turn into a pandemic through mutation, may be imported from abroad. In addition, the more people abroad who come down with the illness, the greater is the likelihood, even with travel restrictions, that the disease will find ways to infect more U.S. residents, whether traveling elsewhere or remaining here. Accordingly, we recommended that the United States, along with other developed countries, provide significant financial assistance to developing countries to manufacture vaccines matched to the pandemic (once the formula and production techniques are refined).

To their credit, the federal government, some state and local governments, and part of the private sector have taken some measures since we released our Interim Report that move in the right direction:²⁴

- The Influenza Genome Sequencing Project, an international effort which is supported by the U.S. government, is making progress in sequencing the genetic patterns of the many types of influenza virus (the sequence of each virus is more than 13,000 letters long). The faster and more accurately particular strains of any virus can be sequenced, the more rapidly it should be possible to identify a vaccine that will be perfectly matched to immunize people against any particular virus strain that could be the source of a pandemic.
- HHS is reporting progress in developing and stockpiling “pre-pandemic vaccines”, or those that work against current strains of H5N1, and which could provide some protection against a pandemic flu strain. At the time of our Interim Report, it was anticipated that the federal government would have shortly stockpiled 4 million courses of an H5N1 vaccine. As of mid-November, 2006, HHS expected to have another 5 million courses of pre-pandemic vaccines stockpiled in 2007.
- The United States and other countries continue working on a “universal vaccine” that would provide immunity to a broad range of viruses,

²⁴ Some of these measures are summarized in Department of Health and Human Services, 2006

including one that could otherwise result in a pandemic.

- In November, 2006, it was reported that a new antiviral medication, Peramivir, may offer a new line of defense against the H5N1 virus.²⁶ Peramivir is delivered by injection rather than orally, as is the case with the other two antivirals, Tamiflu and Relenza. The U.S. government should accelerate any testing of the safety and efficacy of this new antiviral drug, and if it eventually turns out to be a better medication than the existing ones, the government should begin stockpiling it as well.
- The Centers for Disease Control and Prevention issued in February 2007 new “interim” guidelines to advise states, businesses, families, and local communities on what measures they can and should take in the event of a pandemic, pending the availability of enough vaccine to inoculate the U.S. population. A severity index will be published that will rate the expected damage from a pandemic, in much the same way that hurricanes are rated (from Category 1 to Category 5). Among the highlights of the guidance, and depending on the severity of the outbreak: sick individuals should stay home 7-10 days; household members should remain home for at least a week; schools and child care facilities should be closed for up to 12 weeks; all public gatherings should be closed; and workplace policies should be changed to allow for flex time and off-site working.²⁷
- Many states have conducted pandemic flu exercises, encouraged and financially supported by HHS. Such exercises are crucial not only for pandemic planning, but for planning for a wide range of contingencies. Perhaps the most thorough such exercise to date has been conducted outside the United States – in Great Britain in the fall of 2006. Among the most significant lessons from the British exercise is that

remote-site work plans, which many businesses have been counting on if a pandemic occurs, may not be as effective for some firms as expected. Even if the Internet continues to operate, some individuals working from home may experience technical difficulties with their equipment and not be able to resolve them without the aid of “help desks” from work. Banks, in particular, did not have confidence in their ability to ensure the reliability of off-site trading.²⁸ Accordingly, it may be necessary for firms to have back-up plans (incentive pay, for example) to encourage some of their personnel to come into worksites to maintain operations. It is not clear, however, whether these plans would work in an actual pandemic.

At a minimum, mounting evidence strengthens the case for “social distancing” -- staying at home but wearing masks if one has to go out in public, and canceling public events (including school and church services) -- as an important way to minimize the impact of any pandemic outbreak.²⁹

We applaud and are encouraged by the progress that has been made toward enhancing protection from a future pandemic. However, the fact remains that the United States – and the rest of the world – are still not ready for a pandemic outbreak. We therefore cannot overstate the importance and urgency of the recommendations we outlined in detail in our Interim Report on this subject, the key elements of which we summarize below:

- We urged that a variety of measures be undertaken to expedite vaccine production to reach the federal government’s official objective of being able to immunize all Americans against pandemic flu well before the current goal, the year 2011. In our view, this will require further research on vaccine production methods that do not require the traditional egg-based technologies, beyond what has already been funded. In addition, the U.S. government,

²⁶ See www.news-medical.net/?id=211117.

²⁷ Centers for Disease Control (2007). See also the following document for establishing priority among various parts of the nation’s critical infrastructure during a possible pandemic: http://www.dhs.gov/xlibrary/assets/niac/niac-pandemic-wg_v8-011707.pdf

²⁸ See “The Drawbacks of Homework-Banks and Avian Flu,” *The Economist*, December, 2006.

²⁹ See Stobbe 2006.



working with other governments of other developed countries, should be prepared to fund the construction of vaccine production plants, here and elsewhere around the world, especially in the developing world.³⁰ And the United States and other governments should explore ways to license the use of adjuvants (which allow a given amount of vaccine to be stretched among more persons) that may be developed by private firms, provided that those firms are compensated with appropriate royalties (to induce continued innovation). All of these efforts are critical not only to preserve human lives, but to maximize the resiliency of the private and public sectors should a pandemic occur.

- The federal government should take more aggressive steps to provide medical treatment to sick individuals in the event of a pandemic, including the support of testing and R&D for developing other anti-viral medications beyond those currently in use, the purchase of additional ventilators, and the training of more individuals to use them. Regional emergency preparedness councils, whose formation we recommend in Chapter 6, may also be able to help in this regard. We also recommended in our Interim Report stepped-up educational efforts aimed at helping Americans help themselves in a pandemic crisis; we are encouraged that more has been done in this area since we released that report.

- The federal government also should be more aggressive in assuring business and public sector continuity in the event of a pandemic. We are pleased that the federal government is paying more attention to the inter-linkages between different sectors of the economy,³¹ and that more organizations, private and public, have been simulating their pandemic readiness plans. We urge the federal government to continue to monitor and publicize these efforts, and not to relax its guard in what could be a long-term effort. The outbreak of H5N1 strains in Europe, Indonesia and Africa this past winter should serve as strong warning signals that the threat of a future pandemic remains (although thankfully, as of early March, 2007, none of the recent strains have shown signs of easy human-to-human transmissibility). We discuss a range of other business continuity recommendations, which apply also to other types of emergencies, in chapter 6.

Recommendation #6: To contain and minimize the risk of another pandemic, the federal government should:

- Enhance research and development of a range of vaccine-production technologies and antiviral medications;**
- Subsidize the production of pandemic-specific flu vaccine, when it is developed, in the United States and in the developing world;**
- Take more aggressive steps to provide medical care to individuals who may contract pandemic flu;**
- Ensure that private and public sector business continuity plans are in place and continually tested, and monitored.**

³⁰ HHS reports that the U.S. government has provided \$10 million to the World Health Organization to support vaccine development programs. This amount falls far short of the \$10 billion that could be required to cover the costs of a perfect match pandemic vaccine for people in the developing world. See Financial Services Roundtable (2006b). Even the World Bank's estimate of \$1.2-1.5 billion as the cost of fighting the avian flu influenza over the next few years is small compared to the cost of combating a full-blown pandemic. For the World Bank estimate, see www.cidrap.umn.edu/cidrap/content/influenza/avianflu/news/dec0406worldbank.html.

³¹ IN early 2007, a federal advisory committee issued a series of recommendations aimed at improving coordination of the readiness activities of different portions of the nation's critical infrastructure to better ensure business continuity in the event of a pandemic. See National Infrastructure Advisory Council, The Prioritization of Critical Infrastructure for a Pandemic Outbreak in the United States: Final Report and Recommendations by the Council, January 16, 2007.

CHAPTER 5

PAYING FOR MEGA-CATASTROPHES

Currently, there are multiple ways in which the costs of catastrophes are borne, and these differ by type of catastrophe. We do not propose to replace this system by imposing a one-size-fits-all approach for compensating all losses from all types of catastrophes in the future. For various reasons, that is both unrealistic and inappropriate.

Nonetheless, there are some overarching principles that ought to govern the way our society pays for Mega-CATs once they occur:

- Insurable events ought to be insured to the maximum extent possible by the private market rather than by the government. Put another way, it is not the government's role to assume risks that the private marketplace is fully capable of handling, especially if the government's "insurance" is provided after-the-fact through disaster relief, which is both uncertain in amount and not priced to its potential recipients in advance and, as discussed in Chapter 4, tends to impede before-the-event mitigation efforts.
- There are risks, however, that are so large and/or so uncertain that private insurers or the capital markets either are unwilling to insure them, or that the required premiums are so high that many will not want or cannot afford the insurance. In these cases, there is a role for the federal government to "backstop" the private sector.

We believe that the costs of some Mega-CATs are insurable, and therefore, the main object of government policy as to these risks should be to facilitate the provision of private insurance. We also believe, however, that the costs of certain other Mega-CATs – terrorism in particular -- are not insurable by the private market, and as to these the federal government has an important backstop role to fill. Some Commission members believe that this federal backstop function should also extend to large-scale natural Mega-CATs.

Overall, however, the main aim of policy should be to maximize the purchase of catastrophe insurance:

- Insurance provides better financial protection for individuals and firms than after-the-fact disaster relief.
- The broader the insurance coverage, the less disaster relief will be necessary. With insurance, the costs of risk are borne by those exposed to risk. In contrast, taxpayers (currently or in the future) who may or may not directly bear risks of suffering catastrophe losses pay for disaster relief. Comparing the two systems, insurance is more efficient (because insurance premiums induce more loss avoidance and mitigation) and fairer than disaster relief.

Insurance Principles and Realities

The business of insurance centers around the pooling of risks individual participants might not be able to handle on their own. Two main parameters govern the pricing and availability of insurance: the frequency of the risk event (or the probability of loss), and the size of the loss given the occurrence of the event. In statistical terms, event frequency or probability of loss is modeled as a "loss distribution." The most common distribution is a "normal" one, which has the familiar inverted "U" shape, with a peak in the middle, and "tails" at the two extremes.

For routine events, like auto accidents, and most risks to homes (fire and tornadoes), the loss distribution is well known. Much of the probability is centered on the peak in the middle, and the tails at the end – the low frequency events – are spread out rather thinly. Insurers have relatively little difficulty pricing the insurance for such events, since the average loss can be readily predicted (it is generally the "peak" of the loss distribution), and there is not a lot of uncertainty or "variance" around the average.

The events or risks that create difficulties for insurers are those where the loss distribution is spread out over a large range, reflecting large uncertainties around the likely costs in each year. A further complication is that the shape of the loss distribution itself may be uncertain. In these cases, insurance prices are more difficult to determine, and in some cases, insurers may be reluctant to provide any insurance coverage at all.

Large natural catastrophes – hurricanes and earthquakes – present these sorts of difficulties. They are difficult to predict and when they occur they can generate claims that substantially deplete, or in a worst case exceed, the accumulated capital that the insurer has built up over time. In technical terms, large mega-CATs therefore pose “timing” risks (the event happens before sufficient premiums have been collected to fund payment of claims) and “ambiguity” risks (the shape of the loss distribution itself is not well known or understood).³² Terrorism risks are especially difficult for insurers to price and to cover, since it is essentially impossible to statistically model the likelihood of terrorist incidents or the magnitude of losses, should they occur.

The presence of timing and ambiguity risks does not necessarily make a risk uninsurable by the private market – although it might be so for some insurers, reinsurers or investors, who cannot tolerate catastrophe risk at any price. However, when large catastrophes occur, they can and often do cause insurers to revise their estimates of the risks involved, and thus typically to increase premiums and/or curtail coverage.

For example, in the wake of the 2005 hurricane season (and the immediate preceding years of high hurricane losses), some primary insurers scaled back the coverage they are offering to residents of the Eastern and Gulf coasts. According to one report,

wind damage coverage in the United States has dropped by roughly 60 percent since Katrina, due largely to a huge drop in coverage offered by London-based insurers.³³ At the same time, the independent companies that provide catastrophe models to the insurance industry have raised their estimates of future hurricane losses, while ratings agencies have compelled primary insurers and reinsurers to hold more capital so that they can be better prepared to pay claims due such events. All these factors have led to soaring rates for both homeowners’ and commercial property insurance since the 2005 hurricane season, as discussed further below.

Where they can and do provide insurance, insurers must deal with two other common problems: adverse selection (only the customers posing the highest risks purchase the insurance) and moral hazard (insured parties take greater risks because they know they are insured). Insurers try to minimize adverse selection by marketing insurance to a broad class of customers, and by charging higher premiums to higher risk customers.³⁴ Insurers can address moral hazard by imposing deductibles – or requirements that policyholders bear certain “first dollar” losses – before receiving insurance coverage.

Below, we describe in greater detail the combination of private and public mechanisms that are now available for covering the costs of various types of Mega-CATs. The programs vary by type of event principally for the reason already suggested: some are more insurable than others. In the process, we discuss the problems that currently exist with these programs, and then offer our recommendations for addressing those problems.

³² The larger the losses from an insured event, the more significant the timing risk. For example, according to information supplied by the Insurance Information Institute, homeowners’ losses in Louisiana from Katrina wiped out 25 years of insurance premiums collected in the state. In Mississippi, the damages from Katrina wiped out 17 years of premiums.

³³ Mortgage Bankers Association, 2006, p. 22.

³⁴ There is a limit, however, to addressing the adverse selection problem through pricing alone. As risk pools narrow to include only those presenting the highest risks, the actuarially appropriate premium may be so high that few will purchase the insurance. This may so increase the uncertainty about the expected loss from the risk pool that insurers become unable to price the risks correctly, or even become unwilling to provide any coverage at all. This is essentially why private insurers dropped out of covering flood risks, as discussed later in this report.

During the recent special legislative session, the Florida Legislature enacted legislation allowing participating insurers to select options to expand their FHCF coverage either above or below the current levels.



Natural Catastrophes: Hurricanes and Earthquakes

Who covers the losses from catastrophes? The answer depends on the type of catastrophe, and the willingness of individuals who are exposed to catastrophic risk to purchase insurance to cover it.

Hurricanes

Wind damage from hurricanes is covered under the standard homeowners' policy offered by private insurers. However, water damage due to storm surge or other causes is only covered if individuals purchase federal flood insurance, offered under the NFIP.

The intensity and frequency of hurricanes has led some states to establish certain insurance facilities to fund hurricane losses. Some of these facilities provide primary coverage directly to homeowners who cannot or will not purchase coverage from private insurers in the "voluntary market." These state-sponsored plans are known as "residual markets" facilities. The most prominent of these is the one in Florida, Citizens Property Insurance, which is successor to several previous insurance entities.

Similar residual plans exist in certain other states, including Louisiana.

Florida has also created another insurance facility, the Florida Hurricane Catastrophe Fund (FHCF or the "Florida CAT Fund") to backstop primary insurers, up to a limit. This fund reinsures all primary insurers who offer hurricane coverage in the state, and who must purchase reinsurance from the fund.

During the recent special legislative session, the Florida Legislature enacted legislation allowing participating insurers to select options to expand their FHCF coverage either above or below the current levels. The mandatory coverage has constituted the traditional coverage. For 2007, this coverage will be based on a \$6.1 billion industry retention (the retention is the sum of all insurers' deductibles that apply before the FHCF takes effect). Above that retention, there is a fixed and limited amount of coverage that an insurer would be entitled to for all hurricane events causing losses. For 2007, the FHCF's total capacity is expected to be \$15.85 billion. In other words, the mandatory layer of coverage can be defined as \$15.85 billion capacity on top of the \$6.1 billion industry retention (or the sum of all participating insurers' deductibles).

The new legislation provides for two types of optional coverage below the mandatory FHCF layer of coverage and twelve options for selecting coverage above the mandatory FHCF coverage. The total fund limit also was expanded to approximately \$32 billion when optional coverage is included. The FHCF has the ability to borrow funds to meet claims obligations, which it has done in the wake of Katrina.³⁵ Borrowed funds are repaid, with interest, out of assessments on participating primary insurers.

The Florida CAT fund also is able to provide reinsurance more cheaply to primary insurers than private reinsurers – by one account at rates that are only one quarter or one third of those available in the private market [Wharton Risk Center, 2007]. This is possible because the CAT fund can build up reserves tax-free (unlike private insurers, an issue discussed below) without having to earn a profit.

³⁵ The Florida Cat fund issued \$1.5 billion in bonds after the 2005 hurricane season, and reportedly was prepared to issue up to another \$2.8 billion in bonds to prepare for the 2006 hurricane season, which proved to be benign.

Earthquakes



Earthquake coverage is available to homeowners in virtually all states, but as an option if homeowners choose to purchase. Take-up rates outside California are generally quite low, although as noted earlier, some earthquake risk exists in all states.

In California, where earthquake risks are high, before 1994 homeowners' insurers were required to offer earthquake coverage. The Northridge, California earthquake in that year, however, which was the most expensive earthquake in U.S. history (resulting in \$16.5 billion in insured damage, in 2005 dollars, according to the Insurance Information Institute) led to a change in state policy. Following Northridge, California lawmakers implemented a new approach: rather than continue to require private insurers to offer earthquake coverage, the state created a new entity, the California Earthquake Authority, to do so. The CEA is structured with many different layers of capital:

- Initial layers from private insurers who were permitted not to offer earthquake coverage in exchange for their voluntary participation in capitalizing the CEA and covering the next limited layer of earthquake losses
- Various layers of reinsurance
- A layer financed by state revenue bonds

- A top layer funded by post-event assessments on participating private insurers. The coverage provided by the CEA is capped, currently at approximately \$8.2 billion. This means that in a future earthquake, insured parties would bear any losses exceeding the CAT limit (unless they bought additional coverage on their own).

Unlike the vast majority of homeowners in states exposed to hurricanes who purchase coverage for this risk (and are typically required to do so by their lenders), no more than a third of California homeowners have purchased earthquake insurance. Currently, the take-up rate is less than 14 percent. Two reasons are generally given for this low rate of purchase: Californians generally don't believe they will suffer from significant earthquake damage while they own their homes, or if they do, that the loss will be small. In addition, the standard deductible under the CEA policy is 15 percent of the replacement cost of the structure, which for many homes is a large sum of money. Given the price even for this coverage (and the even higher premiums for a policy with a lower 10 percent deductible), most homeowners choose not to purchase the insurance.

Concerns or Problems With The Current Financing System

The current patchwork of insurance coverage by the public and private sectors is necessary to some degree, because the nature of the risks varies. However, the system has aroused significant concerns, both among those who are exposed to catastrophic risks and policymakers.

Homeowners are understandably worried about the continued availability and affordability of catastrophe insurance. One recent report notes that 10 of the nation's 25 largest homeowners' insurers do not offer catastrophe coverage in the state of Louisiana.³⁶ Several insurers have been cutting back hurricane coverage in Florida, especially since the 2004-05 hurricane seasons.

³⁶ See Coalition to Insure Louisiana, 2006.

A corollary of reduced availability is higher prices. For example, average homeowners' insurance rates have increased far more rapidly in Florida over the 2001-06 period, years of heightened hurricane activity, than in the rest of the country.³⁷ In particular, from the first quarter of 2001 to the first quarter of 2006, the average homeowner rate in Florida jumped from \$673 to \$1,193, an increase of roughly 75 percent. In contrast, the average for the United States as a whole increased by about 45 percent, from \$606 to \$898. Of particular interest is the pattern from the first quarter of 2004 to the first quarter of 2006, or the period covering especially intense hurricane activity. Whereas the average homeowner insurance premium in Florida increased from \$985 to \$1,193 over this period, the increase for the United States as a whole was much smaller, in percentage and absolute terms, from \$826 to \$886.³⁸

Averages conceal even higher rate increases in coastal areas, which naturally are exposed to higher damages. Thus, by various press accounts, rates for coastal residential properties now stand at multiples of their pre-Katrina levels.³⁹ From December 2005 to July 2006, commercial property rates for coastal properties exposed to catastrophic risks increased on average by 70 percent.

Higher insurance premiums understandably are unwelcome to homeowners and owners of commercial properties. But to the extent they reflect, or are permitted to reflect, the true risks of future damage from all sorts of catastrophes, then high premiums do serve a socially useful function: they send appropriate signals to individuals and businesses of the social costs of their decisions to locate in hazard-prone areas and to the consequences of investing, or not investing, in various mitigation measures that may be available. Indeed, as we discussed in chapter 4, if the marketplace, rather than regulators, sets premiums, the effect will be to lower future disaster losses – suffered by individuals and absorbed by taxpayers through disaster relief – by inducing private actors to invest in mitigation

From December 2005 to July 2006, commercial property rates for coastal properties exposed to catastrophic risks increased on average by 70 percent.

measures, or in some cases to move, to reduce their exposure to catastrophic losses.

But higher insurance rates also can lead to public policy problems and challenges, and these constitute additional concerns with the current system. As homeowner insurance premiums continue to rise in areas facing above-average catastrophe risks, increasing numbers of individuals may choose either to drop their insurance or buy policies with considerably higher deductibles. Where this occurs, homeowners are exposed to higher and potentially devastating losses in the event of future catastrophic events. Because the federal government always responds out of humanitarian concern to catastrophes by providing disaster relief to help cover uninsured losses of victims, any reduction in private insurance coverage induced by higher premiums most likely will raise future federal disaster relief costs.

Any increase in disaster relief payments caused by insufficient insurance coverage leads to a second problem with the current financing system. Unlike insurance premiums, which are paid by homeowners directly exposed to catastrophe risks, disaster relief costs are borne by taxpayers (either currently or more likely in the future, because the costs of relief typically are financed by additional federal borrowing) who live outside the damaged regions. This raises an issue of fairness: why should residents of the Midwest, for example, bear disaster costs incurred by those who choose to live on the coasts? There are also potential efficiency costs. To the extent that homeowners do not insure or under-insure

³⁷This contrasts with falling insurance premiums for most other lines of property/casualty coverage, reflecting the market's assessments of the differential risks involved in different types of coverage. See McDonald (2006).

³⁸The data in this paragraph are from Grace and Klein, 2006 and Wharton Risk Center 2007. See, also Padgett, 2006, who cites some homeowners in the Miami area having to pay anywhere between 5 and 10 times higher insurance rates post-Katrina.

³⁹Mortgage Bankers Association, p. 22.

because they expect at least some disaster relief, then they will have less incentive to invest in mitigation.

Mounting insurance premiums for catastrophe risks, even if actuarially appropriate, lead to a third policy-related concern. As insurance rates rise, so does political pressure on state insurance regulators to suppress them artificially – that is, to not permit insurers to charge premiums based on actuarial experience or the best available scientific evidence, or to not allow insurers to pass on fully the costs of reinsurance. In either of these events, more insurers will find it unprofitable not only to write new policies, but to renew existing ones. The net result will be a reduction in the availability of privately-supplied insurance, aggravating one of the main problems that now exists in coastal communities along the Gulf and East coasts. Further, if insurers cannot charge actuarially and scientifically appropriate premiums, then there is a higher risk of insurer insolvencies in the event of future Mega-CATs (thus placing greater burdens on state guaranty funds, and on the surviving insurers who finance these funds, and their policyholders who most likely will ultimately bear these costs).

Finally, as discussed above, some states have responded to the insurance affordability problem by creating their own residual markets insurers. There are at least two policy problems posed by these facilities, however. One issue relates to the fact that residual market insurers tend to offer catastrophe coverage at subsidized rates, which means that states (and thus taxpayers) can be frequently called upon to pay a portion of the claims losses that exceed the insurer's reserves. In addition, subsidized rates reduce incentives for mitigation (since they typically do not reward such investments with actuarially appropriate insurance premium discounts). A second issue is one of fairness: typically, anyone can purchase insurance from the residual facility, which in the past has meant that some homeowners who could easily afford coverage in the voluntary market have been able to take advantage of subsidized rates in the residual market. Florida has limited coverage offered by its residual insurer, Citizens Property, to homes valued less than \$1 million, but this still allows many

other upper income homeowners to purchase the subsidized insurance.

Enhancing Hurricane/Earthquake Insurance Availability and Affordability

Although policymakers cannot reverse the laws of nature that may lead to more costly catastrophic events in the future, chapter 4 outlined several mitigation measures that can discourage construction in higher-risk areas or improve the quality of construction, which would reduce damages when catastrophes occur. But even if no further construction occurs in high risk areas, catastrophic scenarios like those illustrated in chapter 2 may still lead to events with losses running into the hundreds of billions of dollars.

The timing and ambiguity risks associated with scenarios like these, together with the expectation that there will be more intense hurricanes (and possibly earthquakes) in the future, have driven up homeowners' insurance rates significantly since Katrina. The risks associated with Mega-CATs, coupled with regulatory uncertainties, also appear to have led some insurers to withdraw from offering coverage for properties in especially high-risk areas.

In our view, however, these adverse outcomes might be at least partially reversed or mitigated by several policy measures aimed at bringing more capital into catastrophe markets. More capital would spread catastrophe risks among more participants, and would make the risks easier to bear. In the process, insurance could become more affordable and available.

Broaden The Role Of Capital Markets in Financing Catastrophe Risks

The first place to look for more capital is in the capital market itself. For some time, a number of analysts have argued that there is far more capital available in the global capital markets – where trillions of dollars (or equivalents) trade hands every day -- to back catastrophe risks than is held as capital by primary insurers and reinsurers.⁴¹ Furthermore, because

Mega-CATs are uncorrelated with other factors that drive markets, investors, especially large institutional investors, should be able to better diversify their portfolios by holding at least some small portion of their invested assets in high-interest yielding catastrophe-linked bonds.

In fact, property-casualty insurers have been successful in raising over \$10 billion over the past decade, and roughly \$2 billion in the year after Katrina alone, by selling catastrophe-linked bonds: unsecured obligations that pay substantially higher interest rates than government or high-grade corporate bonds of equivalent maturity, but whose principal or interest is cancelable upon certain events or “triggers”: those based on catastrophe claims paid by the specific insurer (indemnity CAT bonds) and those based on some general indicator of catastrophe losses (index CAT bonds).⁴² The cancellation feature is what gives the insurer protection and can make the bond the functional equivalent of capital or reserves. The issuer puts the proceeds of the bond issue “in the bank”, as it were, and doesn’t have to pay the money back if a catastrophe trips the trigger.⁴³ Approximately \$5 billion in CAT bonds were outstanding at year end 2005, up 21 percent from the 2004 end-of-year level.⁴⁴

To date, investors have preferred index-CAT bonds because they minimize the problem of “moral hazard” (the danger that insurers could be less than careful in settling claims in order to trigger the cancellation provision under an indemnity bond contract). As for the issuers or sponsors, index bonds have the advantage of providing post-event certainty to investors about the status of the bonds (specifically whether the losses have hit the “trigger”) more quickly than indemnity bonds, because losses with indices are typically measured more quickly than insurer-specific claims. But index bonds have the

disadvantage of exposing the issuer to “basis risk”, or the risk that its particular claims experience will not track the index closely so that the insurer may get no or limited protection if it suffers unusually high catastrophes claims relative to the index average.

So far, CAT bonds typically have been more expensive than reinsurance. In addition, the index bonds in particular also tend to have relatively high “trigger points” and thus are designed to cover only worst-case losses.

As a result, as important an innovation as they are, CAT bonds have not lived up to the expectations of their enthusiasts and thus have not provided insurers with the comfort that they might have anticipated – at least so far. There are several reasons for this, some due to policy and others due to market perceptions: investor unfamiliarity with the bonds and the modeling that supports them, a lack of sufficient loss experience and therefore uncertainty about pricing (despite the high yields and lack of correlation with other forces driving other asset returns), and the absence of well-established, highly liquid markets for trading these securities.⁴⁵ As the policy impediments are removed, the perception and market problems should diminish in importance.

In particular, we have identified several impediments to the greater use and purchase of CAT bonds that both federal and state policymakers should help overcome:

- There is duplicative and potentially inconsistent regulation of CAT securities at the state level;
- The regulation that does exist slows down the issuance of these securities;

⁴¹ See, e.g., Froot, 2001 and Cummins and Doherty, 2002.

⁴² Life insurers also have been making increasing use of catastrophe-linked securities. See Cowley and Cummins, 2005.

⁴³ One related post-Katrina development is the development of “sidecars,” which fall somewhere between conventional reinsurance and CAT securities. A sidecar is a special purpose entity, which must be licensed as a reinsurer, that reinsures the sponsor, splitting in some fraction the premiums and the losses with the sponsor. Virtually all sidecars are sponsored by reinsurance companies. Between November 2005 and July 2006, over \$3 billion of hedge fund money has flowed into sidecars. Wharton Risk Center (2007).

⁴⁴ Economic Report of the President, 2007, p. 112. Another \$2.5 billion in “sidecar” arrangements also was outstanding at year-end 2005.

⁴⁵ The first publicly acknowledged total loss of principal of a CAT bond (\$190 million) occurred in 2005, as a result of losses due to Hurricane Katrina. This experience cuts in either of two ways. On the one hand, it demonstrated that CAT bonds actually do “work” to protect insurers. On other hand, the fact that principal on a bond actually was totally wiped out may strengthen risk aversion on the part of investors. Furthermore, the fact that even a hurricane as large as Katrina triggered the cancellation of principal of just one, index-based, CAT bond could underscore to other insurers the limits of protection offered by CAT bonds as they currently are structured.

- State regulatory and financial accounting rules have the effect of discouraging the issuance of CAT securities.

Resolution of these problems would not “cure” the availability and affordability problems in the catastrophe insurance market. However, by transferring the timing and ambiguity risks that insurers now bear to a much broader and liquid capital market, several measures could help address problems.

First, under current law, because insurance is regulated by the states, so are CAT securities. This is the case notwithstanding the fact that CAT securities typically are sold throughout the country or on a global basis, and to sophisticated investors. A simpler approach would be to have a federal law and a federal agency (most logically the Securities and Exchange Commission), oversee these securities, and preempt state laws in the process. Consolidating oversight at the federal level would eliminate overlapping, duplicative, and potentially inconsistent regulation of CAT securities, issued on shore, by the 50 states and the District of Columbia.

Second, under the current system, state regulators take time to review and approve each issue of CAT securities. This cumbersome process slows innovation and is unnecessary given the sophistication of the purchasers of these securities. The National Association of Insurance Commissioners has proposed a model law that would attempt to streamline the system by requiring the issuer of the securities (typically a special purpose vehicle) to provide details about the security, and by requiring state regulators to act on the request to issue the securities within 30 days; otherwise, approval is automatic. Nonetheless, the extensive pre-filing requirements and even the 30 day “deemer provision” can make on-shore issues of these securities less attractive than issuing them through less regulated off-shore vehicles.

A simpler approach, analogous to the “shelf registration” of many securities at the SEC (which, as suggested, is the most logical overseer of CAT securities), would be to adopt a “use and file” system. Under this approach, the originator of the transaction could file the necessary public disclosure documents

at the time it offers the securities to investors. If regulation of CAT securities remains in state hands, then we urge state regulators to adopt such a system.

Third, under current regulatory rules, non-indemnity CAT bonds (with payoffs tied to an index of losses rather than to losses of specific insurers) generally are not treated as the equivalent of reinsurance. This has the effect of raising required capital for insurers, which discourages them from issuing the securities in the first place.

Admittedly, there is “basis risk” associated with non-indemnity bonds – the risk that a specific insurer’s loss experience will differ from the loss index to which the bond is tied. But non-indemnity bonds do not entail the moral hazard that is associated with indemnity bonds (the risk that insurers will be lax in paying claims so that losses can cross the threshold at which the bond cancellation provisions are triggered) and thus should be encouraged as a matter of public policy. Sponsors currently have greater freedom to design their bonds when they issue off-shore. U.S. regulation should accord them similar freedom, as long as bond sponsors certify that the bonds are being issued to diversify the insurer’s risk.

U.S. financial accounting rules also may be inhibiting on-shore issues of CAT securities. Post-Enron, the Financial Accounting Standards Board (FASB) has issued new rules regarding the conditions under which special purpose vehicles must be consolidated with their related entities. Although industry experts believe that the structures they typically use to issue their CAT securities do not require consolidation, clarification by the FASB that they definitely do not would remove the ambiguity that hangs over the market.

There are other issues relating to the tax treatment of CAT securities and disclosure rules, among others, that may have the effect of inhibiting on-shore issues of CAT securities. Therefore, it would be productive if the Treasury Department were to undertake a thorough study of this entire subject, and recommend other ways to cut down on the costs and delay associated with on-shore issues of CAT securities by insurers or special purpose vehicles.

At a minimum, these steps would help rectify an anomaly in the CAT bond market: so far, nearly all of these securities have been issued by off-shore entities, suggesting that regulatory constraints have been inhibiting U.S.-based entities from issuing the securities. By attracting at least some CAT bond issues back to this country, such reforms should reduce the costs of their issuance; and lead to the development of greater U.S.-based expertise in designing, issuing and making markets in these securities, thereby deepening the market for them and enhancing liquidity. Lower costs and added liquidity, in turn, should make CAT bonds more attractive to issue and to purchase.

Recommendation #7: Both the federal and state governments should take steps to broaden the role of the capital markets in financing catastrophic risks, in addition to conventional insurance mechanisms:

- a. The Congress should pass legislation establishing national standards for the issuance of catastrophe-linked securities, with regulation assigned to an appropriate federal agency (most likely the Securities and Exchange Commission);
- b. A federal regulator, or in the absence of federal regulation, state regulators should adopt a “use and file” regulatory system for Catastrophe(CAT)-linked securities, rather than requiring prior approval before such securities can be issued;
- c. State insurance regulators and the Financial Accounting Standards Board (FASB) should reform insurance and public accounting rules to facilitate the issuance of CAT-linked securities in the United States; and
- d. The U.S. Treasury Department should undertake a study to determine what other changes in federal and state laws and regulations would reduce barriers to the issuance of CAT-linked securities in the United States.

Recognize Multi-Year Reserves for Natural CATs

Primary insurers would have greater incentives to improve their claims-paying ability, while possibly reducing insurance premiums, if they were allowed for tax and financial reporting purposes to get credit for – that is, to deduct from income as legitimate expenses – annual net additions to reserves for catastrophes and terrorism. Other parties at risk of loss due to catastrophes also would be in a better financial position to withstand loss if they, too, could establish multi-year reserves for this purpose. Current tax law and accounting principles do not permit this, recognizing as deductible expenses only those reserves insurers set aside to pay claims for losses that have actually been incurred (so-called “incurred but not reported losses”) or recognizing estimates for other losses (such as the non-payment of debts) where there is a basis for believing that those losses already have occurred.

Yet, as it is now, insurers (and perhaps certain other parties at risk) implicitly establish catastrophe “reserves” by building up their capital to absorb the losses from those events, should they occur. But earnings on capital are subject to tax, even though as a functional matter, a portion of that capital and thus the earnings on that capital is in fact likely to be called upon, at some point, to pay for claims. If, instead, insurers and other parties at risk were able to establish multi-year reserves – taking deductions for them when adding to them, and recognizing income when the reserves are reduced – then insurers and these other parties could build up these reserves more inexpensively. As a result, insurers would be able, in some combination, to reduce premiums, enhance their financial viability, and thus have greater incentives to make catastrophe coverage available. Other parties at risk (such as banks) also would be better positioned to withstand losses in the event catastrophes occur.

One possible objection to this proposal is that expensing of the net annual additions to catastrophe reserves would reduce the taxable incomes of those parties establishing the reserves, and thus tax collections by the federal government. But this argument is short-sighted. This proposal would shift the timing of the expenses and the related tax liability associated with catastrophes, moving some of it

forward and spreading it out more smoothly over a long time horizon. In contrast, under the current tax and financial reporting systems, when a catastrophe actually occurs and triggers claims payments, insurers can deduct all of the claims paid out in a single year (the same is true for other parties who may suffer catastrophe losses). Even under the proposed system, if a catastrophe results in losses that exceed the annual addition to reserves, so that there is a net reduction in total reserves, then this reduction would be recognized as income and taxed in that year (up to the point where the reserve itself may be exhausted).

Another possible concern is that some insurers and other parties might abuse their ability to spread catastrophe losses out over multiple years and thus artificially and opportunistically manipulate their earnings (for both tax and reporting purposes). This concern can be addressed, however, by IRS rules that would lay out formulae for minimum and maximum additions to these reserves (which, in the case of insurers, could be a function of the premium collected for catastrophic coverage).

It is essential that appropriate safeguards be established to ensure that any catastrophe and/or terrorism reserves that insurers and other parties do establish are restricted solely for the purpose of paying future claims from those events, and cannot be diverted for other purposes.

Recommendation #8: The federal government and the FASB should recognize multi-year reserves established by insurers and other parties at risk for natural catastrophes and terrorism, by allowing annual net additions to such reserves to be permissible deductible expenses for tax and reporting purposes. Such reserves should be restricted to paying claims for future Mega-CATs.

Authorize an Optional Federal Charter For Insurers

In recent years, Congress has considered legislation that would allow insurers, as an option, to choose

a national charter and thus a federal regulator and federal enforcement, rather than continue to be chartered and regulated at the state level. States would continue to be able to levy premium taxes if they wish, so this revenue would not be lost to the states.

The Financial Services Roundtable has supported the Optional Federal Charter (OFC) for insurance. It would lead to greater uniformity in insurance forms, consistent regulation of insurer safety and soundness, and the elimination of overlapping, duplicative regulation and supervision by up to 50 state insurance regulators and thus reduce administrative costs for insurers. In addition, an OFC should promote greater competition that would benefit policyholders. The members of this Commission generally agree that an OFC is desirable and would be beneficial.

To be consistent with a national mandate to assure the financial safety and soundness of insurers, OFC legislation must preempt any state regulation of insurance premiums. There is also no supportable policy rationale for the regulation of insurance premiums generally, or with respect to homeowners' policies in particular – one type of insurance central to this report. This is because the insurance market generally, and the homeowners' insurance market in particular, is highly competitive. Concentration levels are low and the business displays none of the characteristics of natural monopoly that justify price regulation.⁴⁶ Indeed, over the last several decades, price controls in other sectors of the economy – airlines, trucking, energy, and in parts of telecommunications – have been dismantled precisely because policymakers have recognized that these sectors are not subject to natural monopoly and thus should no longer be subject to price (or entry) regulation. The same reasoning should apply to insurance, where concentration levels are lower than in many, if not most, other sectors of the economy where no price regulation exists.

The absence of rate regulation under an OFC means that legislation authorizing an OFC for insurers

⁴⁶ For example, the four-firm concentration ratio in the homeowners' market in Florida in 2005 was just 42 percent, down from 60 percent in 1995 (the eight-firm ratio was 60 percent in 2005, down from 72 percent in 1994). Furthermore, the Herfindahl-Hirschman Index for 2005 – the concentration measure looked to the antitrust enforcement agencies (the Department of Justice and the Federal Trade Commission) -- was just 714, or a level that would signal an unconcentrated market. Grace and Klein (2006), at 22.

would facilitate the ability of insurers to charge actuarially and scientifically appropriate insurance premiums. This is critical to ensuring the maximum availability of catastrophe insurance. Where premiums are artificially suppressed and insurers cannot recover their claims and administrative costs and earn a return on capital commensurate with their risks, then insurers have a fiduciary duty to their owners (shareholders for stock companies, policyholders for mutually organized companies) to limit their coverage offerings. Furthermore, as noted in chapter 4, risk-based premiums, based on the best actuarial and scientific information, are also key to providing appropriate incentives to minimize losses from catastrophes, through investments in mitigation and appropriate location decisions.

Recommendation #9: Authorize an Optional Federal Charter for Insurers: The Congress should authorize insurers, as an option, to operate under a federal charter. The availability of this option would help ensure the availability of privately-supplied catastrophe insurance by allowing market forces, guided by actuarial and scientific principles, to set insurance premiums. The insurance business has the competitive structure to permit market forces to set prices, as businesses are allowed to do in all other sectors of the U.S. economy where the market structures are similarly (or even less) competitive.

Federal Lending To State Guaranty Funds

If too many insurers fail in particular states as a consequence of one or more major natural disasters or a pandemic, the ability of the guaranty funds that back the claims of insolvent insurers in these states (property-casualty and life) to honor these claims may be significantly impaired. This is because guaranty funds are financed by post-event assessments on surviving insurers, and these assessments are typically limited to some fraction of those insurers' annual premiums. In worst case scenarios – whether due to natural catastrophes or a pandemic -- assessment caps could be in place for an extended period, which in turn would mean that beneficiaries of the policies of the failed insurers would have their claims payments extended over significant periods.

Furthermore, even with capped assessments, any solvent insurers who remain in business following one or more catastrophes will be under sustained financial pressure, not only to pay the likely potentially large dollar volumes of claims of their own policyholders, but also the claims of other insurers rendered insolvent by the event(s). For some insurers whose capital positions may be significantly weakened by the catastrophes, these additional assessments could be especially onerous, and perhaps could even force some initially solvent insurers into insolvency themselves. This is especially likely for insurers whose capital is so eroded by the events that, under applicable solvency regulations, they are not permitted going forward to attract new business without new capital infusions – financing that may be very difficult to obtain after the catastrophe(s).

The Commission believes the federal government can and should help avert both these problems – delays on policyholder claims payments and financial threats to the insurers that may initially survive one or more catastrophic events – by having the Treasury Department authorized to lend to state guaranty funds. Federal lending would fill the vacuum in some states which might find themselves in the position of not being able to borrow funds to support their guarantee funds because of constitutional constraints. In principle, states could avoid this problem by raising taxes or cutting other spending to make room for such borrowing. But since overall output is likely to drop in the initial months following any major catastrophe (and over an even longer period in the case of a pandemic), it could be counter-productive to force the state governments to tighten their belts at a time when economic output generally may be falling.

Federal lending would enable the guaranty funds to make prompt claims payments. The guaranty funds would repay the federal loans through the revenue they realize from the future insurer assessments, though the legislation authorizing the Treasury lending may permit the state funds to stretch out those assessments in order to ease the financial burdens on the surviving insurers. The federal government eventually would be made whole, but perhaps over an extended period.

While supporting the availability of federal lending to state guaranty funds, the Commission believes it needs to be subject to an important condition: the Treasury Secretary finds the natural disasters or pandemic pose a grave financial threat to the state guaranty fund or reinsurance facilities. Otherwise, the federal government would be in the position of “bailing out” those funds that have the ability to raise assessment funds on their own to honor the claims of insolvent insurers.

Recommendation #10: For natural disasters or pandemics that are certified by the Treasury Secretary as posing a grave financial risk to state guaranty funds, the Commission urges the Congress to give the Treasury Department the authority to lend to those state funds to assure prompt payment of claims.

Federal Lending to State Catastrophe Insurance or Reinsurance Plans

One or more severe natural catastrophes may also cause significant financial strain for the state insurance or reinsurance plans in a given area. In such events, the plans may not be able to borrow at all, or may not be able to do so on reasonable terms, from their state governments or the capital markets (which also may be under significant financial stress at the time). Accordingly, a majority of Commission members favors allowing the Treasury Department also to lend to these insurance or reinsurance plans, but only under very strict conditions in order not to encourage imprudent design of these plans or behavior of those who operate them, or by state and local policymakers charged with oversight of the insurance industry and mitigation policies.

First, the Treasury Secretary must find that the Mega-CATs threaten such significant financial capital erosion in the state plans that makes it difficult for the plans to continue operating in the future, even though the plans may have the authority to borrow funds from the state. This might happen because any assessments on insurers and/or policyholders required to finance repayment of such borrowings, on top of any post-event(s) increases in premiums due to reassessment of future risks, may be difficult to collect without causing significant hardship on

local residents. In particular, if state regulators suppress general insurance premiums following such future Mega-CATs, then any assessments to replenish the state reinsurance plans and to service the debt they take on might technically restore the plans to solvency, but the level of insurance premiums, including the assessments, could still be left below a threshold that appropriately reflected future risks. In that event, insurance pricing would not be sending the right signals to residents about the risks involved in living in hazardous areas, and could lead to wasteful reconstruction and/or inadequate mitigation against future catastrophes.

Second, the Treasury Secretary must make three additional findings in order to certify the eligibility of the state plan for federal loans. Otherwise, the prospect of tapping into federal loans could introduce its own “moral hazard” that would distort the design of the plans and decision-making by state officials who operate them and who otherwise are charged with authority over insurance and mitigation matters:

1. The state reinsurance plans must be designed and operate on a sound actuarial basis;
2. State policymakers have adopted and are enforcing state-of-the-art building codes.
3. State insurance regulators must permit insurers to charge premiums that fully reflect catastrophe risks, based on the best available actuarial and scientific information available.

State plans could choose to demonstrate compliance with these conditions in the aftermath of properly certified Mega-CATs, or obtain pre-certification, subject to annual review and renewal by the Treasury Department. A pre-certification process would provide state plans with much greater certainty about their eligibility, and would act as a continuous and powerful incentive for state insurance regulators and policymakers generally to maintain policies that promote both market-based pricing of insurance (to help ensure its availability and mitigation-inducing incentives) and adoption and enforcement of appropriate building codes.

Some Commission members oppose federal lending

to state reinsurance plans because they believe that the presence of such plans distorts efficient operation of the market and interposes government (at the state level) for handling claims costs due to natural catastrophes that can readily be handled by the private sector. Creating a federal lending facility, in this view, would simply encourage the creation of more such state plans (or regional plans), which opponents believe not only is unnecessary but counter-productive since state plans do not have to earn a profit and thus can under-price private reinsurers. In the view of some, this subsidizes the purchase of reinsurance, which in turn leads to subsidies of primary insurance premiums that distort private sector decisions about location and mitigation.

The Commission considered but did not reach a consensus on having the federal government not only provide loans to state reinsurance plans, but also to sell reinsurance to them (some of the details that would need to be resolved if federal catastrophe reinsurance were made available are discussed in Appendix C). Advocates of federal reinsurance believe that it would directly address the timing and ambiguity problems posed by large-scale natural catastrophes, and in the process enhance the affordability and/or availability of catastrophe insurance for homeowners. Opponents of federal reinsurance believe that federal reinsurance would entail the foregoing dangers of federal lending to state plans. In addition, they question the ability of any federal authority to set reinsurance rates in a sound actuarial manner. Advocates of federal reinsurance disagree, and suggest that rates could be set either by auctions of reinsurance contracts or by independent catastrophe modeling firms (for more state-specific reinsurance contracts), as discussed in more detail in Appendix C.

***Recommendation #25:*⁴⁷ For events that are certified by the Treasury Secretary as beyond the ability of any state insurance or reinsurance catastrophe plans to respond without suffering substantial capital erosion, a majority of the Commission urges the Congress to authorize the**

Treasury Department to lend to state insurance or reinsurance funds on three strict conditions (to prevent the prospect of federal loans from discouraging sound pricing and cost-effective mitigation). In particular, in order for a state plan to be eligible for a federal loan, the Secretary of the Treasury must also determine that: (1) the state plan has been operated on a sound actuarial basis, (2) the state has adopted and is enforcing state-of-the-art building codes, and (3) insurers are able to charge risk-based premiums. Other members of the Commission disagree, and believe that the federal government should not support state insurance or reinsurance plans because to do so would interfere with private insurance markets and thereby send inappropriate signals about the nature and extent of catastrophe risk in areas prone to natural catastrophes.

Improve The Federal Flood Insurance Program

Floods are another type of natural catastrophe, but we discuss them separately from hurricanes and earthquakes because they are different in character, which the federal government has recognized by creating a specific program in 1968 to insure flood (including storm surge) damage, the National Flood Insurance Program (NFIP). The government established the NFIP because before then private insurers were reluctant to provide flood coverage or if they did only at high premiums. Because of the problem of “adverse selection” only those homeowners and owners of commercial properties situated close to rivers or oceans – those most likely to suffer losses – had an interest in purchasing the insurance.⁴⁸

The NFIP theoretically addresses the adverse selection problem by requiring the owners of properties to purchase the insurance in designated flood zones – those defined by the federal government’s maps to be in areas subject to a one percent annual probability of flood loss – and in communities that adopt and enforce appropriate

⁴⁷ This is the second non-unanimous recommendation reached by the Commission.

floodplain management ordinances.⁴⁹ But the purchase mandate, which was adopted in 1973, is limited only to those owning properties that were financed by a federal chartered lending institution (commercial bank or savings institution). Furthermore, the program in fact never really eliminated adverse selection, while leading to another problem: actuarial unsoundness.

Thus, almost from the start, the premiums charged for flood insurance have not been actuarially based.⁵⁰ Specifically, owners of properties built before 1974 (pre-NFIP) were grandfathered with subsidized premiums set at as much as 60 percent below actuarially justified rates.⁵¹ Discounted rates are also available for properties located in communities that adopt various flood mitigation measures (including publicity about flood preparedness, preservation of open spaces, and regulations governing drainage systems and maintenance, as examples).

In addition, the adverse selection problem has plagued the program from the outset, reflected in the fact that take-up rates for those required to purchase the insurance have never come close to 100 percent. Although definitive figures are absent, the best evidence suggests that anywhere between less than 30 percent to 60 percent of those required to purchase the insurance nationwide do so; voluntary purchases (by those outside flood zones) is even lower, about 10 percent.⁵²

Nonetheless, despite adverse selection, the NFIP has steadily grown in size, and thus in budgetary importance.⁵³ The number of policies written under

the NFIP remained stable at roughly 2 million during the 1980s, but then began to climb steadily thereafter, reaching 5.3 million in September 2006. The value of properties covered by the NFIP has increased even more rapidly than the number of policyholders, from \$99 billion in 1980 to roughly \$1 trillion as of September 2006. This ten-fold increase reflects not only the increase in the number of policies, but rising property values, especially in land areas close to the water. Annual premiums collected by the program have followed dollar exposures, increasing during this same period from just \$160 million in 1980 to \$2.5 billion by September 2006.

One important factor limiting the premium increases is the coverage limit under the NFIP. Since 1994, residential property owners have been able to insure their homes for up to \$250,000, and contents up to \$100,000. Commercial entities also can purchase up to \$500,000 in building coverage, and another \$500,000 to cover contents. Inflation since 1994 thus has steadily eroded the real value of federal flood insurance, a situation we believe could and should be remedied under appropriate conditions, as outlined shortly. In principle, private insurers could supply coverage beyond the ceilings, but in practice few insurers offer this coverage, and none do so in Southern states on the Atlantic Ocean or on the Gulf Coast (Wharton Risk Center 2006). The unavailability of private excess flood insurance almost certainly reflects the problems of adverse selection that gave rise to the NFIP in the first place.

The program's revenues and claims were more or

⁴⁸ The NFIP superseded the Federal Flood Insurance Act of 1956, which also set up a federal flood insurance program, but was limited in scope: where reasonably priced private flood insurance was available, federal insurance could not be purchased. The "reasonable pricing" provision understandably created ambiguity and uncertainty about the availability of federal flood insurance. The NFIP resolved the uncertainties by mandating the purchase of flood insurance in defined flood zones, as discussed in the text. For an excellent summary of the NFIP, see Insurance Information Institute (2005).

⁴⁹ A community qualifies for flood insurance in two ways: (1) by adopting and enforcing floodplain management measures relating to new construction; and (2) ensuring that when substantial improvements to existing properties within the designated flood zones are made, measures are taken to eliminate or minimize future flood damage.

⁵⁰ Initially, federal flood coverage was available only through insurance agents, who were qualified to offer the coverage by the Federal Insurance Administration. In 1979, the FIA was placed under the Federal Emergency Management Agency (FEMA). In 1983, FEMA allowed participating insurers to offer the insurance directly under the "Write-Your-Own" (WYO) program, under which a standard policy is sold under the insurer's name, but the federal government bears responsibility for losses (while collecting the premiums for the insurance charged by the private insurer, less an administrative fee). Under the WYO, insurers also settle, pay and defend all claims arising from flood policies. Nearly all flood policies today are sold under the WYO program.

⁵¹ See Hayes and Shama (2004).

⁵² The lower bound estimate is in COFFI (2005). The Insurance Information Institute (at www.iii.org) estimates the take up rate to range between 40 percent and 60 percent.

⁵³ The data in this paragraph are drawn from The Wharton Risk Center (2007).

less in line from the inception of the program until Katrina and other 2005 hurricanes, which produced over \$23 billion in claims, literally swamping the ability of the program to meet its insurance obligations. Shortly after the hurricane, Congress extended a \$20 billion loan to the program. It is unlikely ever to be repaid in full (and the flood insurance reform bill considered last year in the Senate, discussed immediately below, would have expressly forgiven any obligations the NFIP owed the Treasury as a result of the 2005 hurricane season).

Clearly, the long run challenge in reforming the NFIP is to bring more revenue into the system, at actuarially appropriate rates, and to solve (or at least reduce) the adverse selection problem.⁵⁵ Congress considered two bills in the 109th Congress that would have addressed these challenges, in part, but neither bill was signed into law. The House enacted its bill (H.R. 4973) on June 27, 2006, by a nearly unanimous vote (416-4). The Senate Committee on Banking, Housing and Urban Affairs referred a somewhat similar bill (S. 3589) to the full Senate on June 28, 2006, but the Senate took no action before recessing in 2006.⁵⁶

Both bills would have addressed the funding challenge by moving toward actuarially sound rates (though the two bills took different approaches) and would increase penalties on mortgage lenders and servicers who do not enforce the purchase mandates (by “force placing” the insurance on properties whose owners do not voluntarily purchase coverage). In addition, both bills would authorize more funding for FEMA to update flood maps, which eventually should enlarge the number of properties subject to the purchase mandate. The Senate bill, but not its House counterpart, would extend the purchase mandate to properties financed by state-chartered lenders as well as federally-chartered lenders. Finally, the House bill, but not the Senate version, would increase the coverage ceilings: raising the total residential property ceiling (including contents) from \$350,000 to

\$470,000, while increasing the small business ceiling from \$500,000 to \$670,000.

We believe that this Congress should take up where the last one left off and adopt those reforms that would truly address the fundamental problems with the NFIP. If the challenge is to ensure actuarial soundness and to address adverse selection, then the solutions, in our view, are straightforward:

- The premium structure should be moved toward actuarial soundness; existing subsidies should be phased out.
- Flood insurance maps clearly must be updated, but given the difficulties FEMA has had in updating just the maps for the New Orleans area, any monies appropriated for this purpose should be conditioned on FEMA prioritizing its updating process, so that the highest risk areas of the country are remapped first. In addition, where it has not done so already, FEMA should contract out the remapping, which would accelerate the process.
- Federal, state and local governments should undertake more extensive education programs to make households who live in flood zones aware of their legal obligations to maintain their flood insurance and to know the consequences of not having flood insurance. Enhanced awareness can also have the side benefit of encouraging the purchase of flood insurance by households who have already paid off their mortgages and thus are no longer required to purchase the insurance (but who clearly can benefit from having it).
- Properties financed by state-chartered lending institutions should be subject to the purchase requirement. This extension should apply to current and newly built structures.

We also favor increasing the insurance ceilings, but this should only be done if the premiums on policies

⁵⁵ Premiums on properties that were built before the federal Flood Insurance Rate Maps (FIRMs), first developed in 1974, on average are only about 40 percent of actuarially appropriate rates. Economic Report of the President 2007, p. 115.

⁵⁶ For a complete comparison of the two bills, see King (2006).

with coverage above the current ceilings are set on an actuarial basis. This would mean, for example, that grandfathered or other properties that continue for some time to receive premium subsidies would not be eligible for the higher coverage ceilings until the subsidies are phased out.

There are at least two reasons for raising the coverage ceilings, subject to the foregoing condition. First, as noted, the ceilings have not been changed since 1994, and thus an increase would help restore their real value. Second, higher ceilings could reduce the number of situations in future hurricanes or storms where property owners dispute whether their homeowners' or flood insurance should cover their losses. Where flood insurance coverage is more expansive, homeowners of more expensive properties would be better able to recoup their losses from water damage rather than to press for their homeowners' policies (which cover only wind damage) to cover those losses.

Recommendation # 11: Congress should enact multiple changes to the flood insurance program to put it on a sound actuarial basis, including: phase-out subsidies in existing premiums; educate citizens in flood zones better to promote awareness on their part that they are either obligated or strongly encouraged to purchase flood insurance; prioritize the upgrading of existing flood maps; and extend the flood purchase requirement to properties financed with mortgages made by state-chartered financial institutions. In addition, Congress should raise the insurance ceilings, but only if premiums are assessed on an actuarial basis.

Extend And Modify The Federal Terrorism Reinsurance Program

9/11 has fundamentally changed the world. It awoke the United States and other countries to a terrifying new reality – that in a global age we are exposed to acts that would have been unthinkable in an earlier age. But we now must live, at least for the foreseeable future, with the risk of many kinds of terrorism.

This awareness has had a profound effect on the financial system. The World Trade Center attacks

caused stock markets in New York to shut down for nearly a week. This unprecedented outcome prompted both the private and public sectors actively engaged in financial activity to build and maintain backup information systems so that key customer information is not lost in the event of another terrorist attack. In addition, as discussed below, financial and other firms that belong to the nation's critical infrastructure now have and regularly test emergency plans, for terrorism and other catastrophic events.

The 9/11 terrorist attacks also fundamentally changed the business of insurance in the United States. Until that date, the standard all-risk commercial policies implicitly covered various typical acts of terrorism as an unnamed peril (even after the smaller-scale terrorist incidents in the 1990s). As a result of the deaths, injuries, property damage, and business interruption caused by the 9/11 attacks, insurers and reinsurers paid out an estimated \$36 billion in claims (in 2006 dollars). Most of this loss was borne by the reinsurance industry.

Given the magnitude of the 9/11 attacks, reinsurers understandably reassessed the insurability of terrorism risk, and beginning with their 2002 policies, began to withdraw coverage for acts of terrorism. These decisions had domino-like effects on the rest of the insurance industry and, in turn, on the general economy. Without adequate reinsurance, commercial property-casualty insurers became reluctant to continue covering terrorism risk, and sought permission from state insurance regulators to specifically exclude such risk from their standard commercial coverage. Regulators in 45 states granted this request. The terrorism exclusion, in turn, had negative impacts on commercial real estate construction. Without terrorism coverage, lenders delayed or declined financing of projects that now lacked adequate protection of collateral, and developers in turn delayed or canceled major projects. The Council of Economic Advisers estimated that, as a result, 300,000 jobs were lost.

The threat of further damage to the economy spurred the Congress to enact and the President to sign the Terrorism Risk Insurance Act of 2002 (TRIA), which Congress extended, with

The 9/11 terrorist attacks also fundamentally changed the business of insurance in the United States.

modifications, at the end of 2005 for another two years in the Terrorism Risk Insurance Extension Act (TRIEA). At this writing, Congress is debating whether, and on what terms, to renew TRIEA after it expires on December 31, 2007.

As explained in further detail below, TRIA and TRIEA established the federal government as the backstop reinsurer of certain types of terrorism risk, for most commercial lines carriers, and for certain types of losses: principally, injury to or death of employees, damage to commercial properties and operations due to acts of terrorism committed by foreign nationals. The federal insurance “kicks in” only above specific “retentions” (or deductibles), and even then pays most, but not all, of the claims above that level, up to a designated ceiling. The federal government does not charge for providing this reinsurance beforehand, as a typical private insurer would do, but TRIA and TRIEA do require insurers to repay at least some of the government’s claims payouts over an extended period, subject to the discretion of the Treasury Secretary, whose department administers the program.

Why Terrorism Risk Is Uninsurable By The Private Market: Congress established a government commercial terrorism reinsurance program, not only to prevent terrorism risk from damaging the economy, but also because terrorism risk, beyond some nominal level of damage, is fundamentally uninsurable, for several reasons:

1. First, terrorism poses the risk of extremely large losses, well above even the \$36 billion in insured losses from 9/11 (which up to that time made it the most costly insured event in U.S. history, until it was eclipsed by Hurricane Katrina). The potential losses are especially great – running into the hundreds of billions of dollars (and possibly higher) -- from possible attacks using chemical, biological, nuclear or radiological (CBNR) means (a topic addressed separately below). In addition to the potentially enormous human and



economic consequences of terrorist acts, very large insured losses could threaten the solvency of many, and possibly most, commercial insurers.

2. Second, terrorism risks are not independent, which compounds the potential insolvency problem. Terrorists want to inflict the maximum amount of destruction, disruption and fear, and to do so, they could carry out one or more attacks in close proximity that could have significant impacts on a large portion of any insured portfolio.
3. Third, terrorism risk entails huge uncertainties that are nearly impossible to quantify. Unlike natural catastrophe risks, which can be modeled using a combination of historical and scientific data, terrorism risk is inherently uncertain, and there are insufficient data or any reliable models to enable insurers (or anyone else) to price the risk. The fact that terrorism risk may also depend on actions taken by governments, whether to thwart terrorist attacks (as governments did with the reported attempt to hijack up to 10 transatlantic flights during the summer of 2006) or in response to certain foreign policy initiatives, also compounds the uncertainties.

The Current Terrorism Risk Insurance Program: As modified by TRIEA, the current federal terrorism risk insurance program is designed to address these problems in the commercial property and casualty insurance market. It has the following features:

- Primary and excess commercial property and casualty insurers (including those offering workers’ compensation insurance) are required to “make available” on the same terms and

conditions as are applied to the rest of their policy coverage, insurance for acts of terrorism that have been certified by the Secretary of the Treasury (with the concurrence of the Attorney General and Secretary of the State).⁵⁶ The criteria for constituting a certifiable act include the requirement that the terrorism must be committed by an individual or individuals “acting on behalf of any foreign person or foreign interest” (thus excluding cases of “domestic” terrorism where U.S. citizens trigger an event, such as the 1995 Oklahoma City bombing).⁵⁷ Purchasers of commercial coverage are free to include the terrorism coverage or to decline it, unless states require it to be bought, as is the case with workers’ compensation coverage.

- TRIA, and its extender legislation, TRIEA, applies only to certain types of commercial property and casualty insurance, and does not extend to insurers offering group life coverage or to personal property-casualty coverage such as homeowners or automobile, health or life insurance, or certain other kinds of insurance listed in the Acts.⁵⁸ Coverage under these other lines varies. For example, American homeowners should not assume that their homeowners insurance policies will protect them from loss to their property as a consequence of every possible type of terrorist attack, including those involving chemical, biological, nuclear, or radiological (CBNR) substances. Like many commercial policies, many homeowners’ insurance policies contain, for example, nuclear exclusions and contamination or pollution exclusions.⁵⁹ Also, TRIA only requires that commercial insurers make available terrorism coverage (in policies to which the Act applies) that does not differ materially from the terms, amounts, and other coverage limitations applicable to losses arising

from events other than acts of terrorism, meaning, for example, that an insurer’s long-standing nuclear exclusion is not diminished by the Act’s “make available” requirement. If on the other hand, the carrier’s policy does not typically contain CBNR type exclusions (e.g. workers compensation), then the coverage that is made available cannot add those types of limitations.

- The federal government provides reinsurance on an insurer-specific basis, but only for losses due to certified acts of terrorism that exceed an annual deductible, or “insurer retention,” and even then the law requires some co-insurance by insurers, up to a ceiling. Initially the deductible was set at 15 percent of an insurer’s prior year’s premiums earned from policies insuring U.S. covered risks.⁶⁰ Under TRIEA, the deductible was increased to 17.5 percent in 2006 and currently is 20 percent. The current co-insurance provision requires insurers to share 15 percent of losses above the deductible, up to an annual cap of \$100 billion in aggregate insured losses (until this year, the private co-insurance requirement was 10 percent).
- Neither TRIA nor TRIEA require the federal government to charge premiums for terrorism reinsurance, on the theory that such premiums cannot be actuarially determined (which is one reason why we believe that terrorism is inherently uninsurable in the private market, as we have already pointed out and discuss again further below). Instead, the program requires the Treasury Secretary to recover at least some of any federal claims payments through premium surcharges on commercial insurance policyholders. Additional assessments are discretionary.

⁵⁶ The price for such terrorism coverage, as for the rest of the commercial insurance policy, is determined according to applicable state law, which in many states means that the market sets the price.

⁵⁷ Emphasis in the quotation is added. Both TRIA and TRIEA list criteria for defining a certified act of terrorism. TRIA required losses from individual acts of terrorism to exceed \$5 million to qualify; TRIEA raised this minimum threshold to \$50 million in 2006 and \$100 million in 2007.

⁵⁸ TRIEA excluded several lines of insurance from participation in the reinsurance program that had initially been included under TRIA: commercial auto, burglary and theft, surety, professional liability (although directors’ and officers’ liability insurance remains in the program), and farm owners’ multiple peril.

⁵⁹ See the Government Accountability Office (2006) report for additional detail. According to this report, homeowners’ insurers have long-standing exclusions in their policies similar to the exclusions contained in commercial property/casualty policies.

⁶⁰ The premium attributable to policies that are excluded from the terrorism insurance program is not counted in determining the deductible.

- Finally, the terrorism reinsurance program under TRIEA expires on December 31, 2007, unless it is renewed in some form before then. Anticipating the debate over its extension, the Congress asked the President's Working Group on Financial Markets (PWG) to issue a report by September 30, 2006 on how the insurance market had responded since TRIA/TRIEA were enacted.⁶¹ The report was issued on September 29, 2006.⁶² Several days before, Government Accountability Office (GAO) issued a similar report.⁶³

Post-TRIA/TRIEA Developments in Insurance Markets

The main purpose of TRIA/TRIEA has been accomplished. As the President's Working Group on Financial Markets (2006 or PWG, 2006) has concluded: "[t]he availability and affordability of terrorism risk insurance has improved since the terrorist attacks of September 11, 2001." Further, "[d]espite increases in risk retentions under TRIA," the report notes, "insurers have allocated additional capacity to terrorism risk, prices have declined, and take-up (purchase) rates have increased." Nonetheless, according to the PWG (2006) report (at 3), approximately 40 percent of eligible policyholders have not purchased the coverage.⁶⁴

The most important question going forward is what would happen to the commercial insurance market – and to all those who depend on it – if the terrorism insurance program were permitted to expire? In our view, which reflects the considered judgment of representatives from across the financial services industry, there continues to be as much need for federal reinsurance for terrorism risk today as there was immediately after 9/11.

For one thing, there is little dispute that terrorism risk in the United States continues. The aborted plan to hijack and blow up multiple airliners over the Atlantic last summer is a vivid reminder of this risk. A number of experts continue to warn that the United States remains exposed to more terrorist attacks in the future, especially those involving weapons of mass destruction.

Second, with potential damages from future terrorist attacks at levels near or exceeding those from 9/11, there is little question that private insurance would not be forthcoming without a federal reinsurance program. The potential losses are too large and unpredictable – reflected in the fact that the federal reinsurance program does not charge premiums in advance – for private insurers to bear terrorism risks. Two of the country's leading bond rating agencies, Moody's and Fitch, have issued reports reaching the same conclusion, and pointing to potential disruptions in the commercial real estate market – one of the major problems that led to enactment of TRIA in the first place.⁶⁵

Terrorism Risk Insurance in Other Countries

Certain other countries also have established terrorism insurance programs, some before 9/11.⁶⁶ In Israel, for example, the national government exclusively provides compensation for terrorism losses. There is no private insurance coverage at all. In the United Kingdom, insurers partially pre-fund a reinsurance pool, which in turn pays premiums to the government (after the pool has amassed a certain level of capital), which supplies 100 percent reinsurance for claims that exceed the resources in the pool. In Spain, the government has established

⁶¹ TRIA also contains provisions dealing with liability litigation arising out of certified acts of terrorism, and prohibits federal payment of punitive damages.

⁶² See President's Working Group (2006).

⁶³ See Government Accountability Office (2006).

⁶⁴ For additional information about rising terrorism insurance take-up rates, see Michel-Kerjan and Pedell (2007).

⁶⁵ Rating agency statements cited in DeBoer (2006).

⁶⁶ The summary here is drawn from Treasury (2006), p. 13.

its own insurer for “civil commotion losses.” Policyholders must buy this coverage.

Since the 9/11 attacks, various other countries (including France, Germany, Netherlands and Australia) have established temporary or permanent terrorism risk insurance programs “that involve some degree of governmental participation.”⁶⁷ Other countries (including Austria, India and Taiwan) have private programs without government support.

Finally, both the United Kingdom and France have programs to cover insurer losses from attacks using chemical, nuclear, biological or radiological (CBNR) means, a topic discussed further below.⁶⁸

Renewal and Suggested Modifications to Terrorism Risk Insurance

Given the strong likelihood, if not inevitability, that the commercial insurance market would return to its post 9/11 status once TRIEA expires, we strongly urge the Congress to enact a terrorism reinsurance program with the same key current (2007) features – the 20 percent deductible, 15 percent insurer co-insurance above the retention, and discretionary post-event assessments – plus some additional modifications as discussed below, on a long-term basis.⁶⁹

We have not called for increasing the current 20 percent deductible (beyond the increases that have already occurred under TRIEA) because for many insurers, especially smaller ones without highly diversified portfolios of policyholders, the risk of having to pay claims representing the 20 percent of direct earned premiums from certified acts of terrorism is already substantial. Further increases in the deductible could force cutbacks in coverage offered by some commercial insurers, and thereby

impair the competitiveness of the commercial insurance market.

We take note of ongoing efforts by several organizations to form a pre-funded mutual terrorism insurance pool (somewhat like Pool Re in the United Kingdom) that could bear some, most, or all of the risk of the private sector deductible (and perhaps the co-insurance layer above the deductible, as well).⁷⁰ Such a pool could more efficiently spread the loss of future terrorist incidents, but unless it attracts new capital that is not otherwise already committed to covering this risk – that is, capital of the commercial insurers who must provide terrorism coverage under the “make available” requirement of TRIEA (or its successor) – then a pooling arrangement may better diversify the loss exposures of current insurers, but would not provide any greater protection in the aggregate to the commercial insurance industry from losses due to future acts of terrorism.

We believe that a long-term reinsurance program should address the failure of private insurance markets for terrorism to provide adequate coverage in three risk areas that are not currently covered by TRIEA but should be: CBNR, group life, and domestic terrorism. We consider CBNR risk separately below, and now consider the group life and domestic terrorism issues.

From the start, the federal terrorism reinsurance program has not covered group life insurance. Group life insurance is just as much a commercial insurance product as other forms of commercial insurance coverage, and as a matter of logic should be treated as such in any long-term federal terrorism reinsurance program

Furthermore, there is no logical basis for distinguishing whether a terrorist is pursuing

⁶⁷ PWG (2006), at 13.

⁶⁸ See Michel-Kerjan and Pedell (2006).

⁶⁹ Our only reason for not recommending that the program not be made permanent is that it is possible one day that the nation will not be exposed to terrorism risks. In that event, and if the federal government so certifies this to be the case, then in our view a federal terrorism insurance program no longer would be necessary.

⁷⁰ In one version of this idea, the federal government no longer would backstop individual insurers, but instead backstop the pool, which would effectively stand as the intermediary between individual commercial insurers and the federal government.

domestic aims or is acting on behalf of foreign interests or governments, as has been the case under the federal terrorism reinsurance program so far. Terrorism is terrorism, and the reasons for it do not matter. Domestic terrorism is just as unpredictable and poses the same risk of huge losses as the “foreign terrorism” that is covered by a federal terrorism reinsurance program. Accordingly, we urge that any long-term terrorism reinsurance program include domestic as well as foreign terrorism.

Recommendation #12: Congress should authorize federal terrorism reinsurance for commercial lines insurers on a long-term basis on mostly the same terms that exist for 2007 under TRIEA, but with added coverage for group life insurance and for acts by domestic terrorists. The Commission urges the implementation of such a program as soon as possible, since the existing terrorism program expires by the end of 2007 and already commercial policies, which extend beyond December 31, 2007, are being renewed without terrorism coverage after that date (given the uncertainties about the continuation of a federal terrorism reinsurance program).

Establish A Separate, More Comprehensive and Permanent Program For Covering Losses From Chemical, Biological, Nuclear, Radiological (CBNR) Attack

Both the PWG and the GAO reports acknowledge that effectively no private market exists in CBNR insurance coverage except in cases where state law requires insurers to cover it (such as for workers’ compensation). This is true now, and it was the case before 9/11. Traditionally, third-party insurance companies in any line of the insurance business – not just the commercial lines covered by TRIA and TRIEA, but in all other commercial and personal lines – have not offered coverage for CBNR risks, except for the limited state requirement for workers’ compensation coverage. More broadly, no other financial institutions or other parties at risk of loss from a CBNR attack establish reserves for such events or “price” their consequences into the products or services they sell. This is not surprising. A CBNR attack on U.S. soil would be akin to, if not in fact,

an act of War (which both commercial and personal lines insurers historically have excluded from their policies). It is the responsibility of the federal government to provide a strong national defense to prevent foreign enemies from attacking the United States, and should one or more ever do so, U.S. citizens and commercial establishments rightly would look to the federal government for reconstruction and compensation.

Since this is the case, federal policy should explicitly acknowledge this reality and establish a separate, more comprehensive, program to cover the losses of insurers and other parties at risk for losses arising out of a CBNR attack, whether mounted by a domestic or a foreign national, or by a foreign government. Further, because the potential losses of CBNR attacks could be uniquely large and thus uninsurable, the federal government should bear all losses to insurers and other parties at risk of damage. With such loss bearing formally acknowledged, insurers could then make coverage available, acting in effect as a claims agent for the federal government in the aftermath of a CBNR attack.

Recommendation #13: The Congress should establish a separate, more comprehensive and permanent program for covering losses due to a CBNR attack by any party or government. Because CBNR attacks are inherently uninsurable and the responsibility both for preventing and dealing with them is uniquely a federal one, such a program should cover all losses to the insurance industry and other parties at risk. Only with such a CBNR program in place could insurers make CBNR coverage available and thus act as claims agents for the federal government. As with terrorism coverage, the Commission urges the Congress to promptly enact a separate CBNR risk program.

Ensure Payment Of Life Insurance Policies In Case Of Pandemic

The potential huge loss of life from a major pandemic would be a human catastrophe of enormous dimensions. Most of those who would suffer this fate also would have life insurance, either individually or through group policies of their employees. One critical question is whether, in a worst case, the

insurers of those policies would be able to pay those claims.

In chapter 2, and in our Interim Report on pandemics, we cited estimates of the Insurance Information Institute that the additional claims costs from pandemic-related deaths could cost over \$130 billion and threaten the ability of a number of insurers to honor their insurance contracts. We therefore urged in the Interim Report that Congress urgently study how this outcome might be avoided or at least minimized. This is important not only for the families of possible victims of the flu, but is vital for sustaining confidence in the life industry as a whole.

We reaffirm our earlier recommendation that Congress study this matter, but in the interim we also urge that state governments give immediate consideration to financing state insurer guaranty funds that have been created to pay the claims of failed insurers, and further that Congress authorize the Treasury to guarantee such loans or extend loans outright to states that may be unable to issue such debt, as recommended earlier.

Recommendation #14: The Congress should examine ways to ensure that life insurance policies are promptly paid in the event of a pandemic, with special attention given to federal lending to state guaranty funds that pay claims of insolvent insurers.



CHAPTER 6

IMPROVING RESPONSES TO AND RECOVERY FROM MEGA-CATASTROPHES

Although sound investments in mitigation measures can reduce losses from most catastrophes, advance preparation by the private and public sectors for responding to multiple needs of people and organizations in the immediate aftermath of a catastrophe and over the longer run in recovering from one can minimize deaths, injuries and interruptions in the lives of all those affected. In our closing chapter, we review some of the major needs that arise after catastrophes and offer our recommendations for improving current response and recovery mechanisms.

Meet Liquidity Needs

As noted in chapter 3, meeting the financial needs of victims in the wake of a Mega-CAT is of paramount importance. We offer below a number of recommendations, mostly drawn from our Interim Report on Accelerating the Katrina Recovery, to better meet these needs.

Cash: One of the first things catastrophe victims need is cash or its equivalent – to pay for food, travel, and other incidentals. Despite the problems with fraud in the use of debit cards in the wake of Katrina, the distribution of emergency liquidity through debit cards rather than cash remains a good idea. The General Accountability Office has found that debit cards can reduce the need for cash in an emergency by approximately 40 percent.⁷¹ A task force of the American Bankers Association recently recommended that the Treasury Department assist in the development of a uniform debit card deployment strategy across all federal disaster financial aid agencies, and that both Treasury and FEMA harness the ability of charitable organizations to add their

benefits to debit cards.⁷² Such a strategy should also have better means of identifying which individuals have received assistance so that “double dipping” (or more) does not occur. Greater use of debit cards for emergency purposes would also be consistent with the trend toward the use of such cards for state-provided benefits.⁷³

In fact, in July 2006, the Department of Homeland Security announced a revision of its debit card program to apply in future emergencies. Under the new rules, immediate disaster aid would not exceed \$500, and would be handed out only after identities and addresses were checked.

Of course, as we have noted, even debit card systems cannot function unless telecommunications and electricity systems are also operating. This underscores the need for backup contingency planning across sectors discussed later in this chapter.

Loan Forbearance: Second, in chapter 3, we observed that beyond the immediate need for liquidity, many individuals and families whose homes have been severely damaged or destroyed in a mega-catastrophe are likely to be unable to service their mortgage loans for extended periods. Although it is impossible to lay down a fixed, one-size-fits-all rule for all catastrophes, it is also useful to learn from the Katrina experience and avoid having to reinvent the wheel the next time a mega-CAT occurs.

Accordingly, we recommended in our Interim Report on Accelerating the Katrina Recovery and reaffirm here that regulators, lenders, and the housing GSEs should adopt a mortgage forbearance plan for victims of defined Mega-CATs, with allowances for

⁷¹ Kutz, 2006.

⁷² American Bankers Association, 2006.

⁷³ According to the November 18, 2006 edition of *The Economist* (at p. 81), “dozens of state governments – among them Texas, Colorado, and Georgia – are using Visa and MasterCard-branded prepaid cards to provide child support and other government benefits. This cuts fraud and saves governments money.”

longer or shorter periods depending on the severity of damage to the property. We suggest here the adoption of a more generic rule, perhaps triggered upon a Presidential declaration, which would support the offering of mortgage forbearance commensurate with the severity of damage in given areas. The extent of forbearance could be determined through cooperation among the housing and banking regulators, lenders and the housing GSEs. In addition, the use of visual mapping techniques can be useful in assessing the extent and location of damage to physical structures.

Individuals who are eligible to get help through a forbearance program should know that as soon as possible, both for humanitarian and financial reasons. The greater the uncertainty about loan repayment obligations, the more financial hardship individuals and their families will suffer. In addition, uncertainty makes it difficult for individuals to decide whether and when to return to the affected areas.

In fact, after Katrina, lenders in the area made every effort to inform homeowner/borrowers of their forbearance policies through direct mail (where it was available), print and broadcast advertising, outreach to the news media, posters, dedicated customer service telephone lines, and engaging community organizations to spread word of the available relief. This kind of outreach should become standard in future Mega-CATs that trigger loan forbearance.

Disaster Lending: Following Katrina, there were many complaints about the slow processing and excessively bureaucratic nature of the SBA disaster loan relief program. The SBA responded to these complaints by announcing on February 27, 2006 its Disaster Loan Partners Initiative, through which the SBA will ultimately be soliciting bids from local banks and other entities to assist in processing SBA loans. The American Bankers Association's Joint Preparedness Task Force, however, has urged an even simpler and more efficient process that would integrate financial institutions more fully into the disaster lending process by enabling authorized institutions to directly offer disaster loans in a manner

similar to the SBA's 7a. program for business loans. We endorse this recommendation.⁷⁴

Several other lending and aid related reforms are appropriate. First, under current practice, borrowers of SBA loans can be required to repay them if they receive any other disaster assistance or insurance proceeds, even if such monies have been used or will be used to repair the borrower's property or to provide compensation for loss in the property's value. This seems especially onerous. A more sympathetic policy would be one under which the SBA redefined "duplicate benefits" (which trigger loan repayment) to mean only those funds received by homeowner-borrowers that are above the costs of repairs or the reduction in value of the property.

Second, different government entities – FEMA, the SBA and HUD – are often involved in disaster relief and recovery. These agencies oftentimes use different appraisals of damaged properties. These agencies should work together to coordinate their valuations in the future, to eliminate inconsistencies and duplication.

Third, low-income homeowners are least able to afford any delays in receiving funds under SBA's borrowing programs. To minimize such an adverse outcome, the SBA should review its underwriting guidelines with a view toward supporting low-income borrowers after disasters. In addition, the SBA should streamline the loan origination process and eliminate any unnecessary procedures and underwriting standards that delay the agency's loan closings.

Fourth, the National Environment Policy Act can require environmental reviews of reconstruction efforts following disasters where federal funds are used (most commonly through Community Development Block Grants). In the experience of certain members of the Commission, the NEPA requirements have interfered with the efficient distribution of recovery funds. The Congress should amend NEPA to ensure that its requirements do not unnecessarily interfere with the efficient distribution of recovery funds.

⁷⁴ ABA Task Force, p. 3.

Emergency Liquidity and the Federal Reserve:

Third, depending on the nature and severity of the catastrophe, there may be a need for the Federal Reserve to lend liberally to financial institutions to enable them to meet the liquidity needs of their customers, both commercial and individual. We discussed this issue in some detail in connection with a possible pandemic in our Interim Report on that subject, but there could be similar needs in other Mega-CATs.

Recommendation #15: The federal government should pursue several approaches for meeting the liquidity needs of individuals and businesses in the aftermath of future catastrophes (or, in the case of a pandemic, during such a crisis):

- a. The federal government should distribute emergency liquidity, to the maximum extent possible, through debit cards rather than cash.
- b. Regulators, lenders, and the housing GSEs should support the offering of forbearance on mortgage loans that is commensurate with the severity of damage in given areas. Financial institutions, working with consumer organizations and state and local officials, should communicate clearly any forbearance plan to all affected individuals and stakeholders.
- c. Congress and various federal agencies should modify current distribution channels for federal disaster assistance. In particular, the Small Business Administration should permit authorized financial institutions to directly offer SBA-guaranteed disaster loans (without applicants having to go through the SBA itself); the SBA should define its treatment of “duplicate benefits” to include only compensation beyond that necessary for repairs; relevant government agencies (SBA, FEMA, and HUD) should coordinate their valuations and appraisals of damaged properties; the SBA should review its

underwriting standards to support lower-income borrowers and reduce delays in the loan origination and closing process after disasters; and Congress should modify requirements under the National Environmental Policy Act that may impede recovery from disasters.

- d. The Federal Reserve should be ready to fulfill its lender-of-last-resort functions (acting through financial institutions) to meet liquidity needs of the economy, or parts thereof, in Mega-CATS

Authorize Non-Binding Arbitration for “Wind vs. Water” Coverage

As we noted in chapter 3, some observers have suggested that, in the case of hurricane and flood related catastrophes in particular, post-event disputes over what portion of the damage of a particular property is due to wind (which is covered by the standard homeowners’ insurance policy) and what is due to flood or storm surge (which is covered by national flood insurance, if the property owner has bought a policy) could be better resolved if the standard homeowners’ policy were revised by the states to include all perils, or both wind and water coverage. This would effectively privatize federal flood insurance by wrapping flood coverage into the standard homeowners’ policy.

Although, in principle, an “all perils” policy would avoid the need to apportion damage by cause in storm-related catastrophes, it runs directly into the problem of “adverse selection.” which is why private insurers did not cover flood damage before the NFIP was established, and why even today, private insurance coverage above the NFIP ceilings is so limited.⁷⁵ Adverse selection exists when only those most at risk of suffering damage from an event purchase insurance. This leads to high expected claims, and possibly a high risk load, which in combination lead to high premiums. But this outcome can cause a vicious cycle: some, or perhaps many, high risk individuals who otherwise might buy the insurance would be deterred from buying

⁷⁵ The Wharton Risk Center (2007) reports that such additional coverage is only available in a few states, none of them on the East or Gulf Coasts.

it because of the high cost, leaving only those who can afford the insurance and those presenting the greatest risk in the pool of insureds. This outcome, in turn, can lead to even higher premiums that further diminishes the number willing to purchase coverage, and perhaps eventually to a situation where insurers have too few buyers to enable them to underwrite coverage with any confidence. At this point, the risk becomes uninsurable by the private market, which indeed was the situation prior to the establishment of the NFIP.

A requirement that insurers only offer homeowners' policies that combine wind with water and flood damage, therefore, could lead to a similar outcome in areas with high flood risks, which could include most properties along certain parts of the East and Gulf coasts, as well as inland areas subject to flood risks in the rest of the country. To be clear: mandated all perils coverage could lead insurers to withdraw from offering any homeowners' coverage at all in certain locations with high flood risks, or if such coverage is offered, only at considerably higher premiums than is currently the case. Knowing or fearing this to be the case, insurance departments in states with high flood risks easily could be tempted to require insurers doing any business in their states to offer coverage to everyone, even at premiums below the actuarial risks involved. Depending on the extent of mandated subsidy involved, insurers could decide to withdraw from offering any coverage in the affected states altogether.

Clearly, we do not believe this to be an acceptable outcome. Nor do we believe that homeowners, once fully aware of the implications or potential dangers of an all perils mandate, would welcome this outcome either.

There are better ways, in our view, to address the "wind vs. water" problem where it exists. First, even in the wake of Hurricane Katrina, where this issue began to surface, well over 95 percent of all claims were resolved quickly without dispute. Second, homeowners who do have disputes may find them more expeditiously resolved if they agree to non-binding arbitration, either before or after they file their lawsuits. Accordingly, we urge all states, and especially those along the East and Gulf coasts,

to authorize this method of alternative dispute resolution. Third, the reforms in the flood insurance program that we outlined in chapter 5 – specifically an increase in the insurance ceilings (provided the premiums are actuarially sound) – should avoid some disputes that might otherwise occur.

Recommendation # 16: States exposed to catastrophic hurricane risks (such as those along the East and Gulf coasts) should authorize non-binding arbitration to resolve future "wind vs. water" coverage disputes.

Add Prevention and Preparedness Funding to the Stafford Act

An oft-stated aphorism is that an "ounce of prevention is worth a pound of cure." Such a statement could not be more apt in the case of disasters and especially Mega-CATs. Every expert we have consulted, either directly or through public statements, underscores the importance of planning in advance for disasters.

This is not the main thrust of the Stafford Act, however, which focuses primarily on providing disaster relief after the fact. This must change. The Act should be amended to authorize significantly greater expenditures, provided in the form of matching funds, to encourage states to undertake prevention measures, and in particular the enforcement of building codes. Additional incentives (perhaps in the form of an additional match) should be provided for states that participate in Regional Councils, as we elaborate below.

All pre-event planning should assume that communications facilities will be knocked out for some period of time, which means that responsibilities for specific tasks should be clearly defined in advance so that each organization,

An oft-stated aphorism is that an "ounce of prevention is worth a pound of cure." Such a statement could not be more apt in the case of disasters and especially Mega-CATs.

governmental unit, and individual knows what it or he or she is supposed to do without receiving instructions from others.

Recommendation # 17: Congress should strengthen the Stafford Act, which authorizes post-event disaster relief, by authorizing additional funds for disaster prevention and preparedness activities. The Congress should appropriate money for this purpose, including additional funds (on a matching basis) to states and localities in areas of high catastrophic risk to support enforcement of building codes.

Expand Scope Of Pre- And Post- Event Regional Coordination

Advance planning at the state and local levels for catastrophic events is neither adequate nor sufficient. One characteristic of many, if not most, Mega-CATs is that their impacts are felt across multiple political jurisdictions – across counties within a state, and across two or more states. This underscores the importance of coordinating the planning both before and after major catastrophes across political boundaries. A brief list of some of the major activities that would benefit from further coordinated effort follows:

- Pre-event: evacuation, communicating risks and responses that individuals can and should take in event of various emergencies
- During events: maintaining law and order, rescues
- Post-event: immediate cleanup activities and long-term recovery

Further, since government depends on the private sector to carry out relief and recovery efforts, it is vital that representatives from the private sector be involved in any pre and post event planning.

In reviewing lessons from Katrina, we concluded in our Interim Report that the best way to ensure that these various activities are coordinated across multiple jurisdictional lines is to form Regional Councils. These Councils would have representatives

from federal, state and local governments, as well as from the private sector. The federal government can and should play a catalyzing role in forming and convening these Councils, either through Executive Order issued by the President or by act of Congress. In addition, the federal government can encourage their formation through pre-event funding incentives.

We proposed the Regional Councils to be advisory in nature. This is largely because most decisions before and after a catastrophe must be tailored to the specific needs of the affected localities. However, there are situations in which the Regional Councils may be needed to override state and local authority. In the immediate aftermath of a catastrophe, local and state governments may not have the resources to respond effectively and expeditiously. In addition, well after the disaster, various levels of government may delay taking effective action that would facilitate more rapid recovery. For example, as our Interim Report highlighted, recovery after Katrina has been slowed by delays in federal revisions of flood maps and related rebuilding requirements, as well as by delays in local decision-making concerning where rebuilding will be permitted and of what type. It is possible that, if vested with sufficient legal authority, the proposed Regional Councils might avoid such situations. We therefore urge the Congress to consider giving some legal decision-making authority to the Regional Councils where other levels of government do not seem to be performing with the appropriate speed and effectiveness.

There are models and efforts for pre and post event regional coordination already in place. Some jurisdictions already cooperate in transportation planning and these structures could be expanded to deal with catastrophes. More directly relevant to the subject of this report, the Treasury Department has taken steps to coordinate financial institutions on a regional basis to ensure they are up and running following various possible future catastrophes. In addition, many cities have adopted and tested their own disaster recovery and operation plans.

The Regional Councils we are recommending would build on all these initiatives. They would broaden participation beyond the city level to regions as a whole, and would extend beyond just the financial

sector to include both the general private and public sectors.

Recommendation # 18: The federal government should expand efforts already launched by the Treasury Department to coordinate financial institution responses to catastrophes on a regional basis, by facilitating the creation of Regional Councils composed of representatives of both the private and public sectors in different parts of the country. These Councils should have a broad mission: to better prepare for a wide range of contingencies in the event of future Mega-CATs, to assist affected regions to recover more rapidly.

Adopt And Monitor Statewide Emergency Preparedness Plans

Advance planning should not stop with the formation of Regional Councils. Both they, and the public and private sector organizations which make them up, should be regularly engaged in testing, and where necessary, updating their emergency plans. Such an effort is well under way in Chicago for the financial sector through the activities of ChicagoFirst, which has planned for a wide range of emergencies, including a possible pandemic. As noted earlier, similar efforts have been mounted in Dallas, Houston and Minnesota. Indeed, the emergency plans for a pandemic that have been tested over the past several months serve as a useful model for regional emergency planning more broadly.

States and their major cities should collaborate on adopting and continuously updating their emergency preparedness plans. Those plans should include the typical elements – such as evacuation procedures, education for residents and procedures for handling basic government functions in the event of a catastrophe – but also should cover credentialing systems that set out how individuals and companies are to be let into a damaged area, whether to assist in the immediate recovery or, in the case of residents, to return to rebuild. One of the problems encountered in the wake of Katrina was that some companies arrived on the scene shortly after the event with equipment but were denied entry into the area. This slowed recovery efforts. A system for credentialing certain emergency teams from the private sector to

enter a damaged area in the immediate aftermath of a catastrophe can literally save lives, help the injured, provide needed supplies and restore some services more quickly.

Recommendation #19: All states and their major cities should collaboratively adopt, regularly update, and continuously test emergency preparedness plans for dealing with Mega-CATs (even states facing low risks of natural catastrophes are exposed to pandemic risks). Such plans should include evacuation procedures, credentialing systems (to identify who can get into a damaged area and when), education for residents, and procedures for handling basic government functions (e.g., police and fire protection and trash pickup) in the wake of various types of Mega-CATs.

Expand Temporary Housing Solutions



Unfortunately, even with the best possible pre-event planning, catastrophic events – especially Mega-CATs – can have significant economic and human impacts on affected areas. Insurance claims payments will cover insured economic losses, but experience dictates that some disaster relief still will have to be provided by the federal government, even if all the recommendations of this report are followed.

In our Interim Report on Accelerating the Katrina Recovery, we focused on two lessons from that experience which should guide future disaster relief and recovery efforts, and we reemphasize them here.

First, except for a pandemic and for possible acts of terrorism (which may target commercial and/or government-owned properties), economic recovery

hinges heavily on the pace of housing reconstruction. Without housing, workers cannot rebuild, and displaced individuals cannot return.

The federal government relied primarily, indeed almost exclusively, on trailer homes provided by FEMA after Katrina. Many thousands of people are still living in these “FEMA trailers” more than 18 months after the hurricane. At the same time, many other trailers were ordered, paid for, and never used.

In the future, the federal government should expand the temporary housing options it considers to include mobile and manufactured homes and housing vouchers (usable by individuals anywhere in the United States). Trailers should be a last resort.

Furthermore, the federal government should learn from the experiences of the two government-financed housing funds created in Louisiana and Mississippi in the aftermath of Katrina and apply the best lessons from each method of disbursing housing assistance funds. In addition, in the aftermath of a major disaster, there is inevitable uncertainty, perhaps neighborhood by neighborhood, surrounding questions of who will return to rebuild and who will decide to build a new life elsewhere. Individuals and families are more likely to return if they know that others on their block or in their neighborhoods will return; conversely, people will be discouraged from moving back if they know that they may only be one of a few residents to return and rebuild.

The disbursement of housing assistance can tilt this calculus toward return, and thus accelerate recovery in a given area (assuming that policymakers deem it safe to return). In our Interim Report on Accelerating the Katrina Recovery, we recommended that the two state housing agencies provide monetary incentives – higher housing allowances – if individuals committed to return and rebuild within a specified period (six months). Given that decisions had already been largely made about the disbursement of these funds by the two state agencies before we were able to issue our report, we recognized the difficulty in implementing this recommendation after this particular disaster. However, looking ahead, we believe that future housing aid for the uninsured, to the extent it is provided, should be disbursed in

a manner that provides incentives for quick return, since this approach can help overcome the natural reluctance of some individuals and families to return to a damaged area given the uncertainties about the reactions of others similarly situated.

Recommendation #20: The federal government should use a variety of temporary housing solutions, pending the rebuilding of permanent residences, following major catastrophes: mobile and manufactured homes, housing vouchers (useable anywhere throughout the United States), and trailers as a last resort. Future disbursement of any government-financed housing funds should draw on lessons learned from funds established for Louisiana and Mississippi in the aftermath of Hurricane Katrina. To the extent feasible, future disbursement policies should use monetary incentives for individuals who make early commitments to rebuilding to help overcome uncertainties that delay decisions to return. Housing policies are critical in the wake of Mega-CATs (except in the case of a pandemic) because without housing, workers cannot rebuild, and displaced individuals cannot return.

Establish Training Programs For Reconstruction Workers

Our analysis of the situation in the Gulf after Katrina also made clear that sustained recovery depends on attracting skilled labor back to the devastated areas, particularly to New Orleans. Much of this will depend on the pace of housing reconstruction, which in turn depends on the various governmental decisions we have identified that must also be made.

But houses cannot be repaired or rebuilt without trained carpenters, electricians, and other construction workers who are specifically capable of helping to rebuild housing. The U.S. Department of Labor should facilitate this retraining as rapidly as possible after future catastrophes, working with local authorities, unions and organizations of home builders.

For example, in the wake of Katrina, the Jefferson Parish Workforce Investment Board, the Home

Builders Institute (HBI) and the Home Builders Association of Great New Orleans worked with others to establish a construction craft training program. HBI also received a grant from Freddie Mac to support a workforce training initiative in the Mississippi grant. These activities demonstrate that training efforts can develop both from the “bottom up” (through local initiatives) and from the federal government, working on a contract basis with appropriate partners.

Residential construction training can be especially useful for younger adults who are no longer in school. The Regional Intergovernmental Councils we have suggested also may be able to help in this regard.

Recommendation #21: The U.S. Department of Labor should assist with the training of local residents (and others who may be attracted to the devastated region) to work in reconstruction-related activities immediately after future catastrophes (and thus have contingency plans for doing so). It is critical in the aftermath of Mega-CATs to attract labor back to any devastated area, not only to assist with the recovery, but also to provide a workforce that will sustain the economic vitality of the affected area in the future.

Monitor and Extend “Critical Infrastructure” Emergency Preparedness

The federal government has done a commendable job encouraging all firms that are part of the nation’s “critical infrastructure” to adopt, regularly update, and simulate their emergency preparedness plans. The concerns about a possible pandemic have accelerated efforts in this respect. As a broad generalization, if firms are prepared for a pandemic – in which it is possible that as much as 40 percent of the workforce in an affected area may not be at work for extended periods – they are likely to be prepared for almost all other possible emergencies.

A key challenge for both the private and public sectors is to sustain this level of readiness. One way to do that is to have the government regularly monitor the readiness of the private sector to continue

operations in the event of major emergencies. In recent months, the Department of Homeland Security has issued a report on the status of readiness for selected cities. This monitoring should be expanded to cover all cities above a certain size in the United States, and should be regularized.

But there is even more to be done. In any economy, economic actors are highly interconnected. Firms in one sector are dependent on many others, for inputs and services. For example, no firm could operate without electricity or telecommunications services.

It is our impression that while individual firms and even specific sectors have made excellent progress toward readying themselves for various types of emergencies, there is much less cross-sector collaboration – in simulation and testing exercises, in particular. Accordingly, we believe one high priority is for the different sectors that belong to the nation’s critical infrastructure to launch and intensify efforts at such cross-sector coordination. In addition, private entities should communicate and coordinate with other relevant organizations and entities, such as the National Incident Management System (NIMS). This can be done through the recommended Regional Councils and through existing state-level incident management structures.

Various agencies of the federal government can facilitate cross-sector coordination, but they should collaborate first among themselves. This probably will take leadership from officials within the Executive Office of the President, and additional funding from the Congress.

Recommendation # 22: The federal government should expand its efforts to monitor the emergency readiness of both the private and public sectors. All firms that are part of the nation’s “critical infrastructure” should launch or enhance efforts to coordinate their emergency preparedness with other sectors, and with other relevant organizations. The federal government should facilitate this cross-sector emergency planning and Congress should appropriate funds necessary to carry it out.

Clarify Nature And Extent Of Temporary Regulatory Relief

It is inevitable that in some catastrophes it will be impossible for individuals and firms to comply with all regulatory requirements. The immediate exigencies of just making it through each day in the immediate aftermath of a tragic event have precedence over meeting filing deadlines and the like. In our Interim Report: *Preparing for Pandemic for Flu: A Call to Action* we recommended in the context of pandemic planning that financial regulators (perhaps working through the Federal Banking Infrastructure Information Committee) provide greater clarity in advance about what regulations they would relax, in what manner, and under what conditions, in order to assist private sector planning for this contingency and to allow better use of scarce time and resources both before and during such an event. We acknowledged that ordinarily regulators might be worried that such pre-signaling might create a “moral hazard” – inducing regulated firms to relax their guard. But we also noted that a pandemic is such an extraordinary circumstance that this danger was likely to be small; few, if any firms, would not comply with their regulatory requirements in the ordinary

course of business just because they would be eligible for relaxation of some rules in the event of a major catastrophe like a pandemic.

We also suggested that this notion of providing advance regulatory clarity should be considered by other regulatory agencies, and that the overall process might be coordinated by the Office of Management Budget (and specifically, its Office of Information and Regulatory Affairs, which oversees the regulatory activities of Executive branch agencies). We reaffirm and broaden that suggestion here to include clarification of temporary regulatory policy in the event of other large catastrophes, such as those covered in this report. This suggestion should apply to state regulatory agencies as well, and if legislation at any level of government is required to permit such temporary forbearance, it should be adopted.

Recommendation #23: Federal and state regulatory agencies should provide firms subject to their jurisdiction with clarity regarding the nature and extent of temporary regulatory relief for various Mega-CATs (especially for a pandemic) so that private sectors can better prepare for them.

CHAPTER 7

CONCLUSION



Catastrophes have occurred in the past. They will continue to do so in the future. The tragedies of 9/11 and Katrina, along with the intense hurricane seasons of 2004 and 2005, have made this all too clear.

As a society we may not be able to prevent most catastrophes – terrorism being a possible exception – but we can do our best to minimize the damage to human beings, property, and the economy when they occur. Policymakers also can take steps to help ensure that individuals are financially protected from at least some of the economic losses they may suffer.

We have undertaken this study and written this report with these objectives in mind. We find that the nation must do better to achieve them. We offer 23 specific recommendations to do so.

Given that any of the events described in this report can happen at any time, we urge policymakers at all relevant levels of government promptly implement these recommendations.

The financial services industry looks forward to being a leader and partner in these efforts.

APPENDIX A



BLUE RIBBON COMMISSION ON MEGA CATASTROPHES

Mr. Edward B. Rust, Jr., Chairman
Chairman and Chief Executive Officer
State Farm Insurance Companies

Mr. Kerry Killinger, Vice Chairman
Chairman and Chief Executive Officer
Washington Mutual, Inc.

Mr. John A. Allison
Chairman and Chief Executive Officer
BB&T Corporation

Mr. Richard E. Anthony
Chairman of the Board and Chief Executive Officer
Synovus

Mr. Gerald L. Baker
Chief Operating Officer
First Horizon National Corporation

Mr. John R. Beran
Executive Vice President and Chief Information
Officer
Comerica Incorporated

Mr. J. Herbert Boydston
President and Chief Executive Officer
Capital One , N.A.

Mr. Brian W. Clymer
Senior Vice President, External Affairs
Prudential Financial Inc.

Mr. Mark Crawford
Chief Risk Officer
Guaranty Financial Services

Mr. Scott Custer
Chairman and Chief Executive Officer
RBC Centura Banks, Inc.

Mr. John Degnan
Vice Chairman and Chief Administrative Officer
The Chubb Corporation

Mr. Ronald G. Downing
Chairman of the Board
National Farm Life Insurance Company
American Council of Life Insurers

Mr. Robert Dubrish
President and CEO, Option One Mortgage
H&R Block

Mr. D. Cameron Findlay
Executive Vice President and General Counsel
Aon Corporation

Mr. Terry Fleming
Director of the Division of Risk Management
Montgomery County, Maryland
Board of Directors
Risk Insurance Management Society

Mr. Frederick W. Geissinger
Chairman and Chief Executive Officer, American
General Financial Services, Inc. –AIG
American International Group, Inc.

Mr. Evan G. Greenberg
President and Chief Executive Officer, ACE Limited
ACE INA Holdings, Inc.

Mr. Michael S. Helfer
General Counsel
Citigroup Inc.

Mr. L. Phillip Humann
Chairman
SunTrust Banks, Inc.

Mr. Bruce A. Jacobs
Executive Vice President
LaSalle Bank Corporation

Mr. Robert James
Senior Managing Director,
Countrywide Financial Corporation
President and Chief Executive Officer
Countrywide Insurance Group

Mr. Thomas A. James
Chairman and Chief Executive Officer
Raymond James Financial, Inc.

Mr. William G. Jurgensen
Chief Executive Officer
Nationwide

Mr. Michael J. Kozlak
Principal
Kozlak Associates

Mr. Edward M. Liddy
Chairman and Chief Executive Officer
The Allstate Corporation

Mr. William A. Longbrake
Vice Chair
Washington Mutual, Inc.

Mr. Samuel Todd Maclin
Executive Vice President
JPMorgan Chase & Co.

Mr. Samuel Marsico
Senior Vice President, Risk Management
Genworth Financial

Mr. Don J. McGrath
President and CEO, BancWest - Chairman and CEO
Bank of the West
BancWest Corporation

Mr. Henry L. Meyer III
Chairman, President and Chief Executive Officer
KeyCorp

Mr. R. King Milling
President
Whitney Holding Corporation

Mr. Masashi Oka
Vice Chairman
UnionBanCal Corporation

Mr. Mark Oman
Group Executive Vice President
Wells Fargo & Company

Mr. Aubrey B. Patterson, Jr.
Chairman and Chief Executive Officer
BancorpSouth, Inc.

Mr. Kieran P. Quinn
Chairman and Chief Executive Officer
Column Financial, Inc.
Mortgage Bankers Association

Mr. Bobby Rayburn
President and Chief Executive Officer
Rayburn and Associates
National Association of Homebuilders

Mr. C. Dowd Ritter
President and Chief Executive Officer
Regions Financial Corporation

Mr. Douglas Smith
Information Security Business Continuity Executive
Bank of America Corporation

Mr. Thomas M. Stevens
Senior Vice President
NRT Inc.
Immediate Past President
National Association of Realtors

Mr. John F. Stillo

Vice President and Chief Financial Officer
Toyota Financial Services

Mr. Stergios Theologides

Executive Vice President, Corporate Affairs and
General Counsel
New Century Financial Corporation

Mr. Richard L. Thomas

Senior Vice President, Chief Underwriting Officer
American International Group, Inc. (AIG)

Mr. Donald K. Truslow

Senior Executive Vice President, Chief Risk Officer
Wachovia Corporation

APPENDIX B

METHODOLOGY FOR ECONOMIC LOSS PROJECTIONS

The Commission engaged Economy.com, the economic forecasting arm of Moody's, to provide projections of the macroeconomic impacts of the four specific mega-CATs described in chapter 2:

- A Category 5 hurricane in Florida that hits primarily the Miami metro area, which includes the Miami metro division, the West Palm Beach metro division, and the Fort Lauderdale metro division;
- A Category 4 hurricane landing on the Northeast coast with a direct hit to the New York City metro area, which includes the New York City metro division, the Nassau-Suffolk metro division, and Northern New Jersey;
- A magnitude 7.8 earthquake in Southern California with the epicenter in the Los Angeles metro area; and
- A magnitude 7.3 earthquake on the New Madrid fault.

The main projected variable of interest is real GDP. The initial negative impact on GDP growth, relative to the baseline, was scaled to the level of damage, and specifically the number of structures, from the AIR Worldwide damage projections. The negative GDP impact is due to a reduction in the growth in personal consumption expenditures and nonresidential investment due to economic dislocation. In the two subsequent periods in each of the scenarios, the simulations project the beginnings of reconstruction activity, which offset the initial negative impact on GDP. In later quarters, GDP growth again declines after the reconstruction effects wear off.

For purposes of the projections, the modelers assumed that these events took place in the third quarter of 2006, the period during which the projections were made. The tables in chapter 2 show the difference in the annualized growth rates in both national GDP and employment between the event

scenario and the baseline Moody's Economy.com forecast.

The Projection Methodology

Moody's Economy.com maintains individual macroeconomic models for 379 metropolitan areas and divisions and all 50 states plus the District of Columbia. Typically the forecast system works from the top down: that is, the U.S. macroeconomic forecast is run first, then the state models take certain U.S. variables as exogenous inputs, and then the metro area models take both U.S. and state variables as exogenous inputs.

For the four disaster scenarios this process was reversed, since the impacts are specific to certain metro areas and states. First the metro models were run, then the metro effects were aggregated up to the states, and then the state-level effects were aggregated as inputs to the U.S. macro model.

The projection of economic effects rested, to a significant extent, on the property damage estimates provided by AIR Worldwide for each of the four scenarios. For the two hurricane scenarios, in particular, the data provided by AIR Worldwide included damage estimates, by property type, where all damages were assumed to be insured since the damages were only for wind damage and not flooding. These estimates included counts of damaged structures, both residential and nonresidential, by extent of damage. For the two earthquake scenarios, AIR Worldwide provided loss estimates for both insured and uninsured losses, counts of damaged structures and extent of damage, and casualties. AIR assumed no casualties in the hurricane scenarios.

Moody's Economy.com used these data to determine impacts on three variables in the metro models: total population, non-wage personal income and construction employment. The effects of adjusting these three variables filter through to other variables

in the model, producing a new scenario forecast for both employment and gross metro product (which are both later scaled up to national impacts).

In particular, the first variable Moody's Economy.com adjusted was population, which then filtered through the model via households; net migration; employment in manufacturing, utilities, information, financial activities, leisure/hospitality, other services, and government; and the labor force participation rate. An upward adjustment to population, for example, has a positive effect on all of the above variables except for the labor force participation rate.

The next variable adjusted was non-wage personal income, which is relevant to disasters because it captures the inflow of federal aid and insurance payments following these events. Since such funds inflows otherwise would have the effect of boosting employment in the models, adjustments in employment levels were made so that only changes in population residing in a given area affect employment.

The final adjustment was to construction employment. Based on calculations of the number of nonresidential housing permits that would be issued following each of the disasters, Moody's Economy.com applied historical ratios of construction workers to permits to adjust construction payrolls up. The upward adjustment to construction payrolls boosted wages and salaries and total employment, which boosted real gross metro product via implied productivity.

The Moody's Economy.com state models are simultaneous models (that is, they are "solved" simultaneously with other state models), unlike the metro models. Also, in the state models there is a direct relationship between housing permits and construction employment so that boosting housing permits automatically increases construction employment. Therefore population, housing permits, and non-wage income were all adjusted simultaneously in the state models.

Adjustments also were made in the national projections using the Moody's Economy.com U.S. Macro Model. In the immediate quarter of the

disaster and the subsequent quarter, the projections reduced real GDP growth on the assumption that the disaster would disrupt economic activity. The degree of disruption was tied to the amount of destruction, especially the number of structures damaged. The economic disruption was concentrated in personal consumption expenditures, especially on durable goods, and fixed nonresidential investment.

In addition, employment and government spending at the U.S. level were adjusted in the quarters following disasters based on the regional changes to income and employment. After making these adjustments, solutions were derived for a new projection, using the relationships in the U.S. Macro Model. In particular, the Macro Model includes a reaction function for monetary policy that assumes the Federal Reserve tightens monetary policy in response to the very strong growth following the disaster in an effort to contain inflation, and then loosens monetary policy as economic growth slows as the surge in reconstruction fades.

Assumptions

The projections make the same assumptions in all four disaster scenarios, with the only differences coming from the distinction between insured and uninsured losses in the earthquake scenarios and the amount of federal aid for each disaster.

Earthquake Scenarios and Population Impacts: AIR Worldwide projects casualties in the two earthquake scenarios (but not in the hurricanes). In the economic projections, the casualties for each metro area or state were simply removed from the population in the quarter of the event. In addition, the displaced population (those who would temporarily leave the metro area or state) was calculated from the numbers of homes that were projected to be destroyed or severely damaged; this number was then multiplied by the average household size in the relevant metro area. The projections assumed that any displaced households would stay in the metro area if there were sufficient vacant housing stock available. Moody's Economy.com maintains separate quarterly forecasts of housing stock for all U.S. metro areas and counties. To calculate available vacant stock in each metro area,

the modelers used the third quarter 2006 estimate of total vacant stock and assumed that some of this stock also would have been destroyed or severely damaged during each earthquake, based on the AIR projections.

In sum, therefore, total available housing stock equals total vacant housing stock less any destroyed stock. The projections assume that displaced residents would absorb all the available vacant stock in the metro area. If there were an undersupply of vacant stock, the modelers assumed that the displaced residents who were unable to find housing in the metro area would move to the closest nearby metro area and absorb the available vacant stock there. The modelers further assumed that 90 percent of all displaced residents eventually would return to their metro areas of origin as houses were rebuilt (over a two year period, with 10 percent of the population returning in each quarter, except for the fifth quarter after the event, when it was assumed that 20 percent would return).

In the case of the Los Angeles earthquake scenario in particular, the modelers assumed that roughly 200,000 residents would leave the state of California and go to Arizona and Nevada. In these cases, an assumption was made, based on distance from the metro area of origin, that 50 percent of displaced residents would not return to their original metro area in Southern California.

At the national level, the Moody's Economy.com population total is summed across five-year age cohorts. Given the small population losses for both earthquake scenarios relative to the total U.S. population, particularly across the age cohorts, population at the national level is not adjusted.

Hurricane Scenarios and Population Impacts:

In the two hurricane scenarios, AIR assumed no casualties, so any population gains or losses are strictly from flows of displaced residents between metro areas and states. The modelers applied the same assumptions about displaced households in the hurricane scenarios that were used in the earthquake scenarios.

Earthquake Scenarios and Housing Permits: In the two earthquake scenarios, AIR provided loss estimates (in dollars) for both insured and uninsured damages. The modelers calculated the percentage of losses in each metro area that were insured and applied this ratio to the number of residential structures that were destroyed. The projections assume that all properties suffering insured losses would be rebuilt and that 50 percent of the uninsured properties experiencing losses would be rebuilt. Of those that are rebuilt, the projections assumed half of all moderately damaged residential structures and apartments/condos would require permits and all destroyed structures would require permits.

Hurricane Scenarios and Permits: AIR assumed that all damages and losses in the hurricane scenarios were insured. Therefore, no adjustment for uninsured losses was necessary in the hurricane scenarios. It was assumed that all destroyed stock and half of all moderately damaged stock would be rebuilt.

Income: In both the hurricane and earthquake scenarios, non-wage income was adjusted for three components: insurance payments to individuals, federal transfer payments to individuals, and rental income losses. To calculate insurance payments to individuals, the modelers summed insured loss totals for residential, mobile home, and renters' losses. In the hurricane scenarios, AIR assumes all losses are insured (since damage occurs only from wind, not flooding), so gross losses are used to calculate insurance payments because these reflect adjustments for insurance deductibles. The modelers assumed that one quarter of total insurance payments would be paid out in the quarter following the event, 55 percent paid out in the second quarter, and the remainder (20 percent), paid out in the third subsequent quarter.

In order to calculate total rental income losses, the modelers first calculated the share of occupied housing stock in each metro area that is renter occupied, using Moody's Economy.com housing stock estimates. They then applied that share to total residential losses (both insured and uninsured in the earthquake scenarios) to derive an estimate of single-family rent losses. The same methodology was repeated for mobile homes, and then the two were summed to arrive at total rental income loss.

To calculate federal transfer payments for disaster relief, the modelers surveyed historical data for past disasters and set federal aid in the earthquake scenarios equal to the total insured loss for that scenario (before demand surge). In the hurricane scenarios, federal aid was set at 75 percent of total insured losses (before demand surge). Total aid was then distributed to each metro area based on the metro area's share of the total loss. The net adjustment to non-wage income is then insurance payments to individuals plus federal aid, less rental income losses.

Scenario Details

Finally, we describe here the details of the specific catastrophe scenarios themselves, as they were simulated by AIR Worldwide, as well as some of the economic impacts that follow. These detailed descriptions supplement those that are summarized in chapter 2 in the body of the report.

Florida Hurricane: In the Florida Hurricane Scenario, a category five hurricane hits the southeastern part of the state in September. The strongest wind speeds (140-143 mph) are recorded in Broward County, which comprises the Fort Lauderdale metropolitan division. Just under one-third of all single-family residential structures suffer extensive or complete damage and have to be rebuilt. In the next-hardest hit area, the Miami metro division, just over one-quarter of single-family residential structures suffer extensive or complete damage. Multifamily structures are harder hit in Miami than in Fort Lauderdale. In Miami, 35 percent of apartment buildings and condos are destroyed, compared to 30 percent in Fort Lauderdale. The next-hardest hit area is the West Palm Beach metro division, where fewer than 10 percent of both single-family and multifamily residences are destroyed.

Property damages from the hurricane amount to about \$170 billion, with Miami sustaining the largest share. The state's population is unaffected by the storm as it is assumed that vacant housing stock elsewhere in the state is sufficient to absorb displaced residents from the Miami, Fort Lauderdale, and West Palm Beach metro divisions. Approximately 1.3 million residents are displaced from these three metro

divisions combined. Fort Lauderdale experiences the largest population loss on an annualized percent change basis (-80.4 percent).

Because of its abundant housing stock, the Tampa-St. Petersburg-Clearwater metro area absorbs the largest number of displaced residents—nearly 600,000. On an annualized percent change basis, the Naples-Marco Island metro area in Southwest Florida is the biggest gainer of population (357 percent).

The displaced population in Miami, Fort Lauderdale and West Palm Beach gradually returns over the next two years, and by 2008Q2, population is back to its pre-hurricane level. Population growth converges to its pre-hurricane rate by the fourth quarter of 2008 in all metro areas.

Population growth is the primary driver of employment growth in the metro area and state models. As such, declines in population will reduce job growth while rising population will increase job growth. However, because of the extensive damage to residential and nonresidential structures, rebuilding and cleanup is expected to lead to surging construction employment in the state over the three quarters following the event. In the directly impacted metro divisions in the Miami metro area, employment declines in the quarter of the event and then surges in the final quarter of the year as rebuilding activity gets underway. There is a large decline in employment in the third quarter of 2007 as most of the rebuilding is completed and construction payrolls fall.

In the state's other metro areas that absorb displaced residents, job growth jumps in the quarter of the event along with the increase in population. Over the next two years, job growth follows the opposite pattern compared to the affected metro areas. As displaced residents begin leaving these metro areas in the quarter following the hurricane, employment growth declines.

In the metro models, the growth rate of real gross metro product is simply the sum of employment growth and implied productivity in any given quarter. Therefore, the patterns for GDP and employment are exactly the same. The hurricane does not throw the state or any of its metro areas into a recession. In

fact the only quarter of negative output growth in the state is the third quarter of 2007—the result of a loss of nearly 900,000 construction industry jobs.

At the U.S. level the construction activity following the hurricane boosts employment growth and real GDP growth well above their baseline levels for the three quarters following the hurricane. However, growth then slows dramatically in the second half of 2007 due to the large contraction in residential construction as building winds down. Real GDP never contracts on a quarter-to-quarter basis, although employment does in the fourth quarter of 2007 and is flat in the first quarter of 2008. Real GDP and employment return to their baseline levels in 2009.

Northeast Hurricane Scenario: In this scenario, a Category 4 hurricane with maximum wind speeds of 116 mph strikes Monmouth County, New Jersey and the New York City metro division, with Brooklyn and Queens the most severely affected. Damages from this hurricane are smaller than for the Florida hurricane because in the most directly impacted areas, less than 1 percent of residential housing stock is destroyed.

Gross losses in the Northeast hurricane scenario amount to about \$167 billion, with most of the damage sustained in the New York City metro division. Approximately 1.2 million residents are displaced and projected to leave their residences in the New York City, Nassau-Suffolk, and Edison metro divisions and in the Atlantic City metro area. New York City sustains the largest decline in population as a result of the storm, losing about 700,000 residents. The biggest loss in terms of annualized percentage change is in the Edison metro division, which is projected to suffer an annualized 43 percent decline in population in the third quarter of 2006.

The Philadelphia, Camden, and Newark metro divisions and the Trenton and Bridgeport metro areas gain population as the result of displaced residents moving to these areas. The Philadelphia metro division absorbs the largest number of displaced residents, nearly 700,000. On an annualized percentage basis, the Trenton metro area gains the most.

The projected patterns of job gains and losses follow the same trends as in the Florida hurricane scenario. In the directly affected metro areas, employment and output decline in the quarter of the hurricane and then are elevated for the following three quarters as construction employment pushes job growth higher than in the baseline forecast. Job growth and output decline in the fifth quarter after the event, as construction and rebuilding are completed. Job growth gradually converges to its pre-hurricane rate two years after the event.

At the national level the construction activity following the hurricane boosts employment growth and real GDP growth well above their baseline levels for the three quarters following the hurricane. However, growth then slows to well below potential after the residential construction and other rebuilding winds down. Real GDP growth never contracts on a quarter-to-quarter basis, although employment does decline to a small degree by the fifth quarter after



the event. Real GDP and employment return to their baseline levels two years after the hurricane.

New Madrid Earthquake: This scenario projects the impact of a M7.3 earthquake occurring on the New Madrid fault line which runs through Missouri and Tennessee. The Memphis metro area sustains the largest impact in terms of both population and property damage. The Jonesboro, Arkansas metro area suffers the most casualties, with just over 2,000 dead. Between displaced residents from Memphis and Jackson, Tennessee suffers the largest population loss among the affected states. The only other state

to lose population is Illinois, due to large displaced populations in Decatur and Danville. Arkansas, Indiana, and Missouri all gain population as they absorb displaced residents from Memphis, Jackson, Decatur and Danville. Memphis loses nearly 150,000 residents in the quarter of the event, including casualties. The largest decline in population on an annualized percent change basis is in Danville, Illinois.

Total losses from the earthquake are projected to be \$224 billion, with the losses fairly evenly distributed across Tennessee, Missouri, Illinois and Arkansas. At the metro area level, Memphis and Jonesboro suffer the highest dollar amount of losses, while Memphis and St. Louis suffer the greatest damage to residential structures.

Absolute job losses are largest in Memphis, with about 50,000 jobs lost in the quarter of the event. Losses in Danville are the largest on an annualized percentage basis. Although job growth in Memphis returns to its baseline growth rate by two years after the event, the level of employment remains around 1 percent lower than it would have been in the baseline forecast. This is because of permanent population losses due to casualties and displaced households that do not return to the metro area.

Decatur, Jackson, TN, Springfield and St. Louis all experience three consecutive quarters of negative GDP growth, from the fifth quarter through the eighth quarter after the event.

At the U.S. level the construction activity following the earthquake boosts employment growth and real GDP growth well above their baseline levels for the three quarters following the earthquake. However, the economy then weakens dramatically due to the large falloff in residential construction as building winds down. In fact, real GDP suffers a slight contraction in the fifth and sixth quarters after the event; employment follows a similar pattern. Both employment and real GDP return to their baseline levels by roughly ten quarters after the event.

Los Angeles Earthquake: The Los Angeles earthquake scenario is by far the most devastating of the four scenarios, with \$721 billion in damages (both

insured and uninsured). The metro divisions of Los Angeles and Santa Ana (Orange County) sustain the most damage from the M7.8 quake, with Los Angeles incurring 76 percent of the total losses and Santa Ana accounting for 19 percent. Just about one-quarter of all single-family and multifamily housing stock is destroyed in Los Angeles, and one-half that share is destroyed in Santa Ana.

AIR Worldwide projects roughly 18,000 casualties in the Los Angeles metro division and 2,600 in the Santa Ana metro division. All vacant housing stock in the Los Angeles and Santa Ana metro divisions is fully absorbed by displaced residents, who then absorb all of the vacant housing stock in the other southern California metro areas, boosting their populations. It is also assumed that a significant portion of the displaced from Los Angeles and Santa Ana leave the state, going to Las Vegas, Phoenix and Tucson. Of those who leave, it is assumed that only 50 percent return to California, so that the state sustains a permanent loss in population.

Bakersfield, Riverside, San Diego and Santa Barbara all experience a 30 percent to 40 percent annualized increase in population in the quarter of the event, although Riverside and Bakersfield receive the largest absolute numbers of displaced residents. As a result of the huge influx of displaced residents into Bakersfield, both population and income levels are higher throughout the forecast horizon for Bakersfield and lower in Los Angeles and Santa Ana.

Because of the permanent population loss in California in the initial quarter, population in the state does not return to its pre-disaster level until the seventh quarter after the event. Similarly, the long-run level of employment is lower in the earthquake scenario than in the baseline scenario, although employment recovers to its pre-hurricane level much faster (due to construction employment) than does employment.

At the U.S. level the construction activity following the earthquake boosts employment and real GDP growth well above their baseline levels for the three quarters following the hurricane. However, growth then slows dramatically to well below potential, due to the large contraction in residential construction

This Appendix discusses some of the design issues that must be resolved if a federal reinsurance program were to be adopted. As noted in the text, the Commission did not reach consensus on whether the federal government should sell reinsurance to state reinsurance plans.

Form of Coverage

If the federal reinsurance program were patterned off of the federal lending program favored by a majority of Commission members, the reinsurance would apply to Mega-CATs (one or more during a calendar year) certified by the Secretary of the Treasury as individually or in combination posing a significant threat of capital erosion in state natural catastrophe reinsurance plans.

The reinsurance could take a conventional form: reimbursement of claims payments, upon the triggering event (the Treasury determination), above some deductible. As under the terrorism reinsurance program, the deductible could take the form of some percentage of direct earned premium of the state plan, or some percentage of the coverage ceiling.

An open issue is whether the reinsurance contract would require some form of co-insurance on top of the deductible, as is the case under the federal terrorism reinsurance program. A co-insurance element has two advantages: it still leaves a role for private reinsurance, and it gives primary insurers incentives to monitor claims for “padding” or fraud after disasters have occurred. On the other hand, a co-insurance requirement would limit the financial protection afforded by the reinsurance contract.

An alternative form of federal reinsurance would take the form of fungible, or tradable, “excess of loss” contracts, which the federal government would auction annually. Such contracts are standardized instruments and have the advantage that they can be traded, among insurers and among other holders. The XOL contracts would pay off a specific amount for each contract above a certain deductible. Any state plan could buy as much or as little of the XOLs as it wanted, up to some limit.

Various proposals considered by the Congress in the 1990s would have had the Treasury auction a limited number of these XOL contracts covering industry losses above a certain level of losses from a single natural disaster. XOL contracts would be sold to the highest bidder, presumably above a base reserve price. Some portion of the proceeds from the revenue from the XOL sales or from reinsurance premiums could go into a mitigation fund, with the remainder retained to cover payouts.

Eligible Purchasers

Again, if the federal reinsurance were modeled after the federal lending program outlined in the text, state plans would be eligible for the reinsurance only if they and state authorities more broadly met the conditions relating to insurance pricing and loss mitigation outlined in the text. In addition, as discussed in the text, the federal government could establish a pre-certification procedure for state plans to provide some advance certainty that they would indeed be eligible for the reinsurance coverage in the event of a triggering event (and an accompanying Treasury Department certification). However, any pre-certification program would have to be subject to regular renewal, based on a reassessment of any new information relating to the eligibility criteria – specifically, any developments in state insurance regulation and mitigation efforts, as well as the pricing of the state plans that might or might not warrant a change in a state plan’s eligibility.

Premiums

Natural disasters are different from terrorism, where no ex ante premiums are charged (only some ex post assessments), because there is some actuarial experience that could be used to set premiums for federal natural catastrophe reinsurance.

If XOL contracts were auctioned, the auction prices would be the functional equivalent of premiums. Alternatively, the federal agency administering the reinsurance program (discussed below) could set the premiums on customized contracts for each

eligible state plan, based on projections by qualified catastrophe modeling firms⁷⁶ Under this approach, the premiums could vary, depending the relative risks of the individual states.

To minimize the possibility of bias, the premium recommendations of the firms could be averaged. An additional protection against bias – and political influence – would be to establish the administering authority with some independence. Thus, for example, if the authority were placed in the Treasury Department, it could be given the quasi-independence that is currently given the regulator of national banks, the Comptroller of the Currency.

A third approach would be for the reinsurance authority to offer both standardized XOL contracts and customized contracts. This would give purchasers more choice, while the premiums from the auctions would help the actuaries set rates on the customized contracts.

Any legislation creating a natural catastrophe reinsurance plan should put any premium revenue into a trust so that it cannot be used for any purpose other than to pay claims (analogous to the FDIC's premium-based reserves for the costs of future bank failures).⁷⁷

Ex Post Assessments

Because a federal reinsurance program would assume timing (and ambiguity) risk, the government would be exposed to the possibility that catastrophe costs in the initial years of the program could exceed – perhaps even substantially (in the case of a true mega-catastrophe) – the total premiums it would collect. In that event, the program must have the authority to borrow from the federal government (which, in turn, would issue Treasury securities, unless Congress offset catastrophe costs with some combination of tax increases and spending cuts). Also, the reinsurance authority could be given the ability to impose ex post assessments to repay any borrowings, and to

determine on whom should they be assessed.

The current terrorism insurance program requires some ex post assessment, although the amount and timing are left to the discretion of the Treasury Secretary. The same approach could be adopted for a natural catastrophe reinsurance program. Two other alternatives are possible, however.

One is to require no ex post assessment, assuming that premiums are charged for the reinsurance. The rationale for this option is that if the premium is actuarially appropriate, then there is no basis for changing it after the fact through an ex post assessment. This is the way private insurance works after all: insurers do not impose a retrospective charge on policyholders if they have a “bad year.” Instead, large losses in a given year may lead insurers to revise their estimates of *future* probabilities, and thus to charge higher premiums in subsequent years. The federal government could justify doing the same under a federal catastrophe reinsurance program.

The other alternative is to impose a stronger *ex post* assessment requirement for natural catastrophes than terrorism, perhaps a legislative direction that the Treasury Secretary *shall* set the assessment so that, over time, it fully repays the federal government, with interest (at the prevailing Treasury rate). The Secretary could be given discretion, however, for relaxing this requirement of full repayment if he or she finds that the catastrophe losses are too great, either in isolation or in combination with catastrophe losses of other years, to support full repayment.

The main argument for full repayment is that it might better ensure that the federal government, and thus federal taxpayers, are “made whole” over the longer run than relying on future premium increases to do the job. It is possible, however, that future premium increases would have the same effect as an ex post assessment, so that the differences between these two options may be less than what might initially appear.

⁷⁶ Currently, there are three such widely recognized firms, which presumably would be qualified. If more such firms enter the market, the authority should consider using them too, assuming their models could be verified with a reasonable degree of accuracy.

⁷⁷ The trust fund requirement would not inhibit the fund from buying Treasury securities with the premium revenue, and thus indirectly funding the rest of the government – as is currently the case with the Social Security trust fund. Indeed, to ensure that the insurance fund's investments are free of default risk, it would be necessary to limit the investments only to Treasury securities (although the fund could incur some interest-rate risk depending on the maturities of those securities).

BIBLIOGRAPHY

American Bankers Association, 2006. "Lessons from the Storms and Other Emergencies, Policy Recommendations of the ABA Joint Preparedness Task Force, June.

Centers for Disease Control, 2007. *Interim Pre-Pandemic Planning Guidance: Community Strategy for Pandemic Influenza Mitigation in the United States* (February).

Center on Federal Financial Institutions (COFFI), 2005. "Federal Flood Insurance After Katrina." Available at www.coffi.org.

Coalition to Insure Louisiana, 2006. *Recommended Public Policy Options for Improving the Availability and Affordability of Property Insurance in Louisiana*, December.

Congressional Budget Office, 2006. *The Budget and Economic Outlook: Fiscal Years 2007-2016* (Washington, D.C.: Congressional Budget Office).

Cowley, Alex and J. David Cummins, 2005. "Securitization of Life Insurance Assets and Liabilities," *Journal of Risk and Insurance*, Vol. 72, pp. 193-226.

Cummins, J. David and Neil A. Doherty, 2002. "Capitalization of the Property- Liability Insurance Industry: Overview," *Journal of Financial Services Research*, Vol. 21, pp. 5-14.

DeBoer, Jeffrey D., 2006. Statement before a Joint Hearing of the Financial Service Committee's Subcommittee on Oversight and Investigations and The Homeland Security Committee's Subcommittee on Intelligence, Information Sharing and Terrorism Risk Assessment regarding Terrorism Threat and the Insurance Market, July 25.

Department of Health and Human Services, 2006. *Pandemic Planning Update III*, November 13.

Economic Report of the President, 2007 (Washington, D.C. : Government Printing Office).

Financial Services Roundtable, 2006a, *Accelerating the Katrina Recovery*, An Interim Report by The Blue Ribbon Commission on Mega-CATs Of The Financial Services Roundtable, October 25 (Washington, D.C.)

Financial Services Roundtable, 2006b, *Preparing for Pandemic Flu: A Call To Action*, An Interim Report by The Blue Ribbon Commission on Mega-Catastrophes Of The Financial Services Roundtable, November 1 (Washington, D.C.)

Froot, Kenneth A., 2001. "A Market for Catastrophe Risk: A Clinical Examination," *Journal of Financial Economics*, Vol. 60, pp. 529-71.

Government Accountability Office, 2006. *Terrorism Insurance: Measuring and Predicting Losses from Unconventional Weapons is Difficult, but Some Industry Exposure Exists*, September.

Grace, Martin F. and Robert W. Klein, 2006. "After the Storms: Property Insurance Markets in Florida", December 11 (unpublished manuscript, on File with the Financial Services Roundtable).

Griggs, Ted, 2007. "Growing Citizens to Add Execs," *The Baton Rouge Advocate*, February 10, p. D1.

Hayes, T.L. and S.S. Shama, 2004. "National Flood Insurance Program: Actuarial Rate Review," (Washington, D.C.: FEMA), available at www.fema.gov/business/nfip/actuarial_rate.htm.

Insurance Information Institute, 2005, *The National Flood Insurance Program*, October (New York: Insurance Information Institute)

Jaffee, Dwight M. and Thomas Russell, 2006. "Should Governments Provide Catastrophe Insurance?" *Economists' Voice*, April (The Berkeley Electronic Press).

King, Rawle O., 2006. "Flood Insurance Reform: Side-By-Side Comparison Of H.R. 4973 and Senate Committee Bill" (Washington, D.C.: Congressional Research Service, The Library of Congress)

Kunreuther, Howard H., 2006. "Disaster Mitigation and Insurance: Learning from Katrina," *The Annals of the American Academy of Political and Social Science*, Voo (Vol.?). 604, pp. 208-27.

Kutz, Gregory D., 2006, Testimony before the Senate Committee on Homeland Security and Governmental Affairs, February 13, 2006.

McCarter, Michael G., 2006. "Statement on Terrorism Insurance Matters Before The Terrorism Insurance Implementation Working Group, National Association of Insurance Commissioners," March 29. Available at http://www.actuary.org/pdf/casualty/tris_032906.pdf.

McDonald, Ian, 2007. "Most Insurance Premiums Likely to Continue to Fall," *The Wall Street Journal*, January 4.

Michel-Kerjan, Erwann O. and Burkhard Pedell, 2006. "How Does The Corporate World Cope with Mega-Terrorism? Puzzling Evidence from Terrorism Insurance Markets," *Journal of Applied Corporate Finance*, Vol. 18, No. 4, pp. 61-75.

Mortgage Bankers Association, 2006. *Natural Disaster Catastrophic Insurance: The Commercial Real Estate Finance Perspective*

O'Hanlon, Michael E., 2002. Protecting the American Homeland (Washington, D.C.: Brookings Institution Press).

Padgett, Tim, 2006. "There's Trouble-Lots Of It-In Paradise," *Time*, November 27, pp. 38-39.

Posner, Richard A., 2005. *Catastrophe: Risk and Response* (New York: Oxford University Press, U.S.).

President's Working Group on Financial Markets, 2006. *Terrorism Risk Insurance*, September (PWG Report)

Ripley, Amanda, 2006. "Floods, Tornadoes, Hurricanes, Wildfires, Earthquakes Why We Won't Prepare," *Time*, August 28, pp. 55-58.

Ritter, John, 2006. "California Races to Repair Levee System," *USA Today*, November 27, p. 4A.

Stobbe, Mike, 2006. "Study Shows What Helped During 1918 Flu," *Associated Press*, December 11.

U.S. National Institute of Building Science, 2005. *Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities* (Washington, D.C.: Multi-hazard Mitigation Council).

Valverde, James L., Jr. and Robert P.Hartwig, 2006. "9/11 and Insurance: The Five Year Anniversary," Insurance Information Institute, September.

Weisbart, Steven, 2006. Pandemic: *Can the Life Insurance Industry Survive the Avian Flu?* [New York: Insurance Information Institute, January 17].

Wharton Risk Center Management and Decision Processes Center, 2007. *Managing Large-Scale Risks In A New Era of Catastrophes* February [Wharton Risk Center Report]

NOTES

NOTES

NOTES

THE FINANCIAL SERVICES ROUNDTABLE



1001 Pennsylvania Ave. NW, Suite 500-S

Washington, DC 20004

Tel: 202.289.4322

Fax: 202.628.2507

Email: info@fsround.org